

# PhD and Engineer in Computer Science and Applied Mathematics

Sebastien MONDET

## Personal Information

Born on 1982-03-20, in Madrid, Spain. French nationality.  
▷ [seb@mondet.org](mailto:seb@mondet.org) — <http://seb.mondet.org>.

## Work Experience

### Since Sept. 2011: Associate Research Scientist at NYU

*Center for Genomics and Systems Biology, Biology Department, New York University.*

### Sept. 2009 – Jun. 2011: Post-doc at the University of Oslo

*Distributed Multimedia Systems (DMMS) group, University of Oslo, Norway.*

- ▷ *SIRIUS Project*: Sensing, Adapting and Protecting Pervasive Information Spaces.
- ▷ Working and advising PhD and Master students on Quality of Information, Distributed Complex Events Processing, Anomaly Detection, Safety and Security, within Sparse Mobile Ad-Hoc Networks, and Resource-Constrained Devices.
- ▷ Personal work on protection middleware with focus on *safety and security of implementations* through meta-programming and formal methods (*IFIP Sec'11* paper; *Promiwag* project).

### Oct. 2006 – Jun. 2009: PhD in Computer Science

*IRIT, University of Toulouse, France.*

Simulation of large 3D natural scenes: modeling and adaptive streaming.

- ▷ *Supervision*: Prof. Mathias Paulin, Geraldine Morin, Romulus Grigoras (Vortex group).
- ▷ *Research focus*: Server resources optimization, multi-resolution content packetization, compression and progressive modeling of plant models, network measurements.
- ▷ *Software realizations*: “Wadis,” “LibGenCyl,” and “OMAN”. Also involved in the development of “NatSim” a visualization tool for natural scenes (Python, OpenGL/GLSL).
- ▷ *Co-Advising*: Master and Engineering students working on 3D streaming for mobile devices.
- ▷ *Internship*: Three months (2008) at the National University of Singapore, under the supervision of Dr. Wei Tsang Ooi.
- ▷ *Teaching*: Assistant at INP-ENSEEIH (“Monitorat”), labs in C Programming, Geometric Modeling, 3D Rendering, Operating Systems, Data-Bases, Multimedia.
- ▷ *Dissertation*: “Adaptive Modeling and Distribution of Large Natural Scenes,” PhD thesis reviewed by Pr. Stefanie Hahmann and Pr. Eckehard Steinbach, and defended on June 8th, 2009.
- ▷ The thesis received the Léopold Escande Award 2009.

### Jul. 2005 – Sept. 2006: Software Engineer

*Avionics Department, Atos Origin Integration (Toulouse, France).*

- ▷ Development for Airbus (EYY) of *embedded* air/ground communication software *qualified* under the **DO-178B standard** (HOOD design, ANSI C, LynxOS, RTRT).
- ▷ Development for Airbus (EYT) of avionic networks testing software (ARINC 429, AFDX, UML, C++, wxWidgets).

### Feb. – Jun. 2005: Master Thesis

*Computer Vision Team, IRIT - UMR 5505 (Toulouse, France)*

Streaming of large point-based 3D scenes, adaptation to resources and navigation.

- ▷ *Keywords*: Point based 3D, Compression, Adaptive Streaming.
- ▷ *Implementation*: Client-Server system over HTTP, TCP and DCCP; C++ with Qt/OpenGL on GNU/Linux.
- ▷ *Advisors*: Geraldine Morin and Romulus Grigoras.

### Jun. – Jul. 2004: Engineering Internship

*Dassault Aviation, (Biarritz, France)*

Processing and visualization module for numerical data measured during polymerization in autoclaves.

- ▷ Technical specifications writing, C++ development for MS-Windows, and Shell/C development for AIX/RS6000.

### 2000 – 2003

Various summer jobs: Math and Spanish private lessons, municipal city cleaning ...

## Publications

### International Journals

- ▷ Cheng, W., Ooi, W. T., Mondet, S., Morin, G., and Grigoras, R.; *Modeling Progressive Mesh Streaming: Does Data Dependency Matter?* ACM TOMCCAP, Vol. 7, Is. 2, 2011.
- ▷ Cheng, W., Mondet, S., Ooi, W. T., Grigoras, R., and Morin, G.; *Network-Aware Streaming of Partially Ordered Media*. IEEE COMSOC MMTC E-letter Volume 5, Number 6, 2010.
- ▷ Mondet, S., Cheng, W., Morin, G., Grigoras, R., Boudon, F., and Ooi, W. T.; *Compact and progressive plant models for streaming in networked virtual environments*. ACM TOMCCAP, Vol. 5, Is. 3, 2009.

### International Conferences

- ▷ Mondet, S., Alberdi, I., and Plagemann, T.; *Generating Optimised and Formally Checked Packet Parsing Code*. IFIP SEC 2011, 2011.
- ▷ Zhu, M., Mondet, S., Morin, G., Ooi, W. T., and Cheng, W.; *Towards peer-assisted rendering in networked virtual environments*. ACM MM'11, 2011.
- ▷ Kamisiński, P., Mondet, S., Goebel, V., and Plagemann, T.; *Resource-Aware Complex Event Processing for Mobile Ubiquitous Environments*. UbiComp'10; OPPORTUNITY Workshop, 2010.
- ▷ Doran, A., Mondet, S., Grigoras, R., Morin, G., Ooi, W. T., and Boudon, F.; *A demonstration of MobiTree: progressive 3D tree models streaming on mobile clients*. ACM Multimedia (Technical Demonstration), 2009.
- ▷ Mondet, S., Cheng, W., Morin, G., and Grigoras, R.; *On Streaming of Realistic 3D Models*. SinFra symposium, 2009.
- ▷ Mondet, S., Cheng, W., Morin, G., Grigoras, R., Boudon, F., and Ooi, W. T.; *Streaming of Plants in Distributed Virtual Environments*. 16th ACM international conference on Multimedia, 2008. **Best Paper Award**.
- ▷ Cheng, W., Ooi, W. T., Mondet, S., Morin, G., and Grigoras, R.; *An Analytical Model for Progressive Mesh Streaming*. 15th ACM international conference on Multimedia, 2007.

### National Conferences

- ▷ Mondet, S., Boudon, F., Hoelt, J., Morin, G., Grigoras, R., Pradal, C., and Paulin, M.; *Compression progressive de modèles de plantes à base de cylindres généralisés*. AFIG, 2007 (in French).
- ▷ Mondet, S., Morin, G., and Grigoras, R.; *Optimized Box-Trees For Server-side Viewpoint Culling On Large 3D Scenes*. GTMG, 2007.
- ▷ Mondet, S., Morin, G., and Grigoras, R.; *Mise en ligne de modèles 3D échelonables basés points*. AFIG, 2005 (in French).

## Research-related Activities

Reviewer for MM'09, MM'10, NOSSDAV'10, TEMU'10, ICME 2011, SIGMAP 2011, CITA 2011, MM'11 (regular papers and open source competition), ACM TOMCCAP, Springer/ACM MMSJ, and The Polish Science Foundation.

Part of two recruitment committees at the University of Oslo.

Organisation team member for CORESA'09.

## Education

### 2006 – 2009: Philosophiæ Doctor in Computer Science

*“Adaptive Modeling and Distribution of Large Natural Scenes,”* University of Toulouse, France.

### 2002 – 2005: Engineering and Master's Degrees

ENSEEIH (National Polytechnic Institute of Engineering in Electrotechnics, Electronics, Computer Science, Hydraulics and Telecommunications). Toulouse, France.

- ▷ Engineer in Computer Science and Applied Mathematics
- ▷ Research-oriented Master's degree on Software Safety and High-Performance Computing.

### 2000 – 2002: Undergraduate; “CPGE”

Preparatory classes for competitive entrance exams into national engineering schools; *speciality “Mathematics and Physics,”* CPGE Louis Barthou, Pau, France.

## Skills

### Programming Languages

OCaml, C, Unix Shells, Coq, Java, Ruby, C++, Python, Ada, SML, Perl, Fortran, Lisp, Prolog, VHDL, assemblers (68k, i386 and PIC).

### Operating systems

GNU/Linux, OpenBSD, Android, Mac OSX, Solaris, MS Windows.  
▷ Administration of a Linux-based development server during 3 years for more than 50 users: Subversion, DokuWiki, Redmine, and Git; with Apache2 (https), OpenLDAP ...

### Technologies

UML 2.0, SDL, HOOD, XML/CSS/XSLT, Data-Base systems, Real-time, CORBA, IP networks, Avionic networks, MANET routing, OpenGL (ES) rendering pipeline.

### Tools

UNIX/POSIX tools, Coq, (La)TeX, Scilab/Matlab, SVN/Git.

### Applied Mathematics

Geometric Modeling, Optimization, Hilbertian signal analysis, Fourier analysis, Optimal control, Graph theory, Partial differential equations, Bayesian classification.

### Languages

*French:* native language.

*Spanish:* native language.

*English:* fluent.

*German and Norwegian:* basic knowledge.

## Software Projects

### Research-related

**Promiwag** is a code-generation library (for now) specialised in packet-parsing code. Promiwag generates C or OCaml code on which safety/security properties are *formally proved*.

- ▷ Objective Caml
- ▷ Uses **Why** and **Alt-Ergo**, for automatic formal proofs.

**Wadis** (*WALK-through DIstant Scenes*) is an experimental testbed for Client-Server streaming of 3D scenes.

- ▷ Objective Caml, and C.
- ▷ Streaming over TCP, UDP, DCCP; uses OpenGL, **Simple Direct-media Layer**, GNU Triangulated Surfaces Library, 3DS Max file format.

**LibGenCyl** is a library for manipulating plants represented by Generalized Cylinders which provides efficient progressive (de)compression, and export/rendering.

- ▷ Pure OCaml, used by **Wadis**.
- ▷ Exports to SVG, VRML, **OpenAlea** and supports OpenGL rendering.

**OMAN** is a toolkit for traffic generation, measurements, and tunneling toolkit, for networking experiments.

- ▷ OCaml, and Bourne Shell.
- ▷ TCP, UDP and DCCP; provides an UDP tunneling system for DCCP on WAN experiments.

**The Master Thesis's Project** was a client-server system for streaming point-based 3D scenes.

- ▷ C++, Bash.
- ▷ HTTP (Apache with CGI), TCP and DCCP; Visualization client based on **PointShop3D**'s render engine.

### Personal – Open Source

**Bracetax** is a simple and deterministic text-processing syntax (*used for this CV*).

- ▷ OCaml, MIT license, [seb.mondet.org/bracetax](http://seb.mondet.org/bracetax).

**Sebib**, *S-Expressions for Bibliography*, is a practical bibliography management system (*also used for this CV*).

- ▷ OCaml, MIT license, [seb.mondet.org/sebib](http://seb.mondet.org/sebib).

**Yaboon** is a set of reusable OCaml modules (*Yet Another Bunch Of OCaml Modules*).

- ▷ MIT license, [yaboon.googlecode.com](http://yaboon.googlecode.com).

## Personal Activities

### Music

Classical, electric and bass guitar.

Have played in and/or initiated various bands, in various styles: *Rock, Hard rock, Funk, Electro-jazz, and Tribal Grind Core*.

### Sports

Taekwondo (*3rd Keup*), Running, Cross-country skiing.

### Hobbies

Juggling, Cinema, Literature.