

DEVELOPER / COMPUTER SCIENTIST

— **Mathematical sciences** (bachelor) — ... — **Computer science** (master) —

$$\sum_{i=0}^{n-1} f(i)$$

```
sum(f(i) for i in range(n))
```


Olivier PIRSON

Belgian, born in 1975

 www.linkedin.com/in/olivierpirson

 olivier.pirson.opi@gmail.com

 <https://europa.eu/!Cw99mX>

 Brussels, Belgium

 bitbucket.org/OPiMedia/workspace/repositories

 www.opimedia.be

EDUCATION AND TRAININGS (complete list: www.opimedia.be/CV/realisations.htm)

2019: Short training **Testing**, Treenity Solutions

REST APIs testing with **Postman** and automation with **Jenkins**

2019:  **Master in computer science**, ULB, 74% **distinction** (followed in **English**)

Theoretical matters and **practical** projects.

(Modules: optimization, algorithms. Options: programming languages, parallelism.)

Master thesis: **Parallelization of an abstract interpreter**, through the **actor** model

2015: **Java programming laboratory**, Business Training via Bruxelles Formation

Learning and development of a web application *RepairCenter* in **Scrum** methodology

2015: **EPFC courses**

Algorithmics – design and analysis, *Preparation for Java certification*, *C++ programming*

2013 – ...: **MOOC** Many **university MOOCs** (online courses), EPFL, Princeton, Stanford...

Algorithmics, **compiler**, **languages**, mathematical **optimization**, **functional**... **paradigms**;

Bash, **C++**, **Java**, **ML**, **Oz**, **Python**, **Scala**...; **Git**...;

English...

2011, 2014 & 2016: Short Evoliris **trainings**

Android, project management, **GNU/Linux**, HTML5/CSS3, network, security, **UML**

2010: **Professional web developer training**, Business Training via Bruxelles Formation

UML, (X)HTML/CSS, MySQL, Apache HTTP Server, PHP, JavaScript, Flash/ActionScript

1998: π **Bachelor in mathematical sciences, computer science orientation**, UCL, satisfaction

Computer projects in C++, Pascal, Java, Tcl/Tk...

COMPUTER SKILLS

Development: **Ada**, OpenCL, **C**, **C++**, **Java**, **Python**, **Scala**, Scheme, *etc.*

Web development: JavaScript/jQuery/AJAX, PHP, (X)HTML/CSS/Sass...; CMS

Databases: **MySQL**, QuickBase...

Operating systems: **GNU/Linux**, Debian, Android, Windows...

Tools: Apache HTTP Server, Doxygen, Eclipse, Emacs, **Git**/Mercurial, (L^A)T_EX, **Makefile**, regex, shell...

Miscellaneous: **parallel** computing, **functional** and **object-oriented** prog. (**OOP**), UML...

CV of June 9, 2023.

Update and  French online version:

www.opimedia.be/CV



LANGUAGES

- 🇫🇷 **French:** mother tongue
- 🇬🇧 **English:** CEFR level B1+
(ULB Master's degree was in English)

MISCELLANEOUS

- 🚗 Driving license B

PROFESSIONAL EXPERIENCES

2020 – . . . : **Solution Building Engineer at Sopra Steria** (ICT consultancy)
Ada development, **Ksh.** . .

2015 – 2016: **Web development for ArtCoreWeb** (web development)

Starting a web development activity (via JobYourSelf, SMart. . . with the aim of becoming freelance), with a partner dealing with commercial and design aspects.

- Design and development of a website for the activity: interactive recursive illustration of the process from a request to its realization. HTML/Sass, JavaScript
www.opimedia.be/CV/2015_ArtCoreWeb/ArtCoreWeb
- Development of a static website: HTML/CSS, Bootstrap, JavaScript.
- Development of an **Android** application prototype in **Java** to easily take pictures of articles in shop and add them with a description on an e-commerce.
- Technical analysis, report writing and sale quotes.
- Learning.

MySQL, PHP, HTML/CSS/Sass, Bootstrap, JavaScript, jQuery, CMS, e-commerce, Android, Java

2011 – 2013: **Web developer at Umedia** (cinema production)

Analysis, **full stack** web development (MySQL, PHP, HTML/CSS, JavaScript), deployment and monitoring on **MindTouch CMS** used internally for document sharing and communication. Development of a template. Interaction with API. Development of tools to be included: calendar, “Facebook-like wall”, lunch reservation. . .

Dismissed following the replacement of the CMS MindTouch by another software managed by an external company.

- CMS administration.
- Migration of CMS from Apache web server under Ubuntu to IIS web server under Windows.
- Cross-reference of employees database with CMS user list.
- Development of a ticketing application in MySQL, PHP, HTML/CSS, JavaScript.
- IT troubleshooting or transfer to the system administrator responsible of the computer park.
- Help to business trainees for the development of online databases with QuickBase.

Ubuntu, Apache HTTP Server, Windows, IIS, MySQL, **PostgreSQL**, PHP, HTML/CSS, JavaScript, jQuery, AJAX, MindTouch, QuickBase

December 2010 – February 2011: **Web developer internship at Vertige** (web development)

Internship following the professional web developer training.

- Analysis, full stack web development (MySQL, PHP, HTML/CSS, JavaScript) and deployment of a “Facebook-like wall” for the website Comedien.be using **SPIP** CMS.
Screenshot of the wall: www.opimedia.be/CV/2010_Vertige/Comedien.be/Mur_de_Comedien.be.png
- Redesign of the *Comedien.be* website login system. Factoring of the existing code.

MySQL, PHP, HTML/CSS, JavaScript, jQuery, AJAX, SPIP

DEVELOPER EXPERIENCES, BY LANGUAGE

⚠ This last section lists personal or didactic projects classified by **programming language**, starting with languages closest to the machine: assembleur, OpenCL, **C**, **C++**, Bash, BASIC, Pascal, PHP, JavaScript, Java, Processing, **Python**, Julia, Scheme, Erlang, **Scala**, Haskell, Prolog, \LaTeX . The mention of the oldest projects is intended to illustrate that I have been programming for a very long time.

You can access subsections from table \equiv of contents of your PDF viewer.

A brief selection in anti-chronological order is available in the *Projects* section of my *europass* profile: <https://europa.eu/!Cw99mX>


Languages I have used and use the most are: **Ada**, **C**, **C++**, **Python**.


Repositories of my free projects (**free software, open source**) on Bitbucket (🔗 **GitHub**-like):

 bitbucket.org/OPiMedia/workspace/repositories

Personal bookmarks on programming languages: www.opimedia.be/DS/languages

CodeSignal; **CodinGame**  level 24  ranking mentor

 **HackerRank** Gold Badges & Certificates: C, C++, Java, JavaScript, Python, SQL; Problem Solving

 **LinkedIn** badges: C (top 96%), C++ (top 99%), Java (top 79%), Python (top 70%);
Bash (top 84%), Git (top 94%), HTML (top 96%)

ASM **assembly** — language close to machine language

2017 master project (23/20): **parallelization** by **SIMD x86** instructions

Implementation and performance analysis of image filter written in C and then in assembly using SIMD (single instruction, multiple data) instructions.

2017 master project (19.5/20): **RiSC-16** architecture

Implementation of arithmetic operations with several RiSC-16 instruction sets.
See also C++ project *cpprisc16*.

2016 master project: **LLVM** assembly, see Java project *Fortran compiler*

~1995 personal projects: **assembly x86**, see C libraries *on MS-DOS* and *on big integers*



OpenCL — derived from **C** for **parallel** programming on multi-core CPU and **GPU**

2018 personal project:  **assertOpenCL**

OpenCL library implementing the missing macro **assert** with respect to C, with examples of host programs in C, C++, Java, Scala and Python.

<https://bitbucket.org/OPiMedia/assertopencl>

2018 master project:  **evaluation and graphical representation of L-systems**

Implementation and performance analysis of LINDENMAYER systems in Python and then OpenCL (**PyOpenCL**) on GPU. These are rewriting systems that generate recursive structures that can be interpreted as fractal figures, particularly plants. Generation of bitmaps, or vector graphics with the **PostScript** programming language.

<https://bitbucket.org/OPiMedia/l-system-in-pyopencl>

2018 master project: see C++ project σ_{odd} *problem*

C — low-level imperative language

2017 master project (19/20): **digital signal controllers dsPIC33** (Harvard architecture)

Implementation of the discrete FOURIER transform computation, handling overflow and accuracy.

~1995 personal project: **library and applications on MS-DOS**

- General part implementing **data structures** and helper functions.
- Part handling **keyboard, mouse and text mode** from MS-DOS interrupts. Development of an interface with drop-down menus like [Turbo Pascal's IDE](#), handled by an **event-driven loop**.
- Part handling **graphic modes**: double buffering, backgrounds display, automation of elements associated with sprites and motion dynamics in an event-driven loop.

Optimization of critical functions by **assembly x86**.

Development of several applications using this library, including a quotes dictionary:

www.opimedia.be/DS/grenier/MS-DOS/online-DOS

~1995 personal project: computation library on **big integers**

Arithmetic operations on integers without size limitations.

Optimization of critical functions by assembly x86.

C++ — static multi-paradigm language

2019 finalist of **C/C++ Challenge Belgium & The Netherlands 2019** organized by Dekimo

2018 personal and master project (17/20):  **parallel numerical verification of the σ_{od} problem**

Mathematical developments of a personal arithmetic conjecture.

Numerical verification of this conjecture with **parallel** technologies **multithreading**, by **message passing (OpenMPI)** and for **GPU (OpenCL)**:

<https://bitbucket.org/OPiMedia/parallel-sigma-odd-problem>

Slides to present the problem and results:

<https://speakerdeck.com/opimedia/parallel-numerical-verification-of-the-s-odd-problem>

distributed computing, **cluster**, **GCC**, **clang**, CxxTest, Cppcheck, Valgrind, **Doxygen**; multithreading, OpenMPI, OpenCL; Makefile, gnuplot, Graphviz

2017 personal project:  **cpprisc16**

C++ library reimplementing the RiSC-16 assembly instruction sets, facilitating experiments compared to the RiSC-16 simulator used for the master project *RiSC-16*.

<https://bitbucket.org/OPiMedia/cpp risc16>

2017 master project (17.5/20):  **PFSP optimization problem**

Implementation and analysis of **iterative improvement heuristics** to solve the optimization problem *Permutation Flow-shop Scheduling Problem* (PFSP).

<https://bitbucket.org/OPiMedia/permutation-flow-shop-scheduling-problem>

2016 master project (18/20): partial collision search in the hash function SHA-1

Parallel/distributed computing by message passing with **OpenMPI** library.

2016 master project (17/20): **scheduler** simulator

Implementation and analysis of methods (global and partitioned) for scheduling tasks.

1997 bachelor project: dynamic website for stock management

C++ server side with CGI in **Perl**. HTML client side and **Tcl/Tk** to display histograms.

1997 bachelor project: implementation of data structures

Implementation and performance analysis of several dictionary structures: naive, library of the time, self-balancing binary search tree AVL, trie.



Bash — shell scripting language

2020 personal project:  *HackerRank [CodinGame...]/helpers*

Support for solving problems such HackerRank, CodinGame... in various languages, by automating among other things the execution and comparison of results:

<https://bitbucket.org/OPiMedia/hackerrank-codingame-helpers>

2020 personal project:  `god`

Command to change directory, like the traditional `cd` command but with a name instead directory, from an association list name-directory: <https://bitbucket.org/OPiMedia/god-bash>

B **BASIC** — simplistic language

~1993 personal project: quotes dictionary in AMOS BASIC on Amiga

See also PHP project *OPiCitations*.

~1991 personal projects: games *Tetris* and *Sokoban* in AmigaBASIC on Amiga

~ 1985 – 1990 personal projects: old games in BASIC on TRS-80 then GW-BASIC on MS-DOS

P **Pascal** — imperative language


1992 year-end school project: polynomial calculator in Turbo Pascal, with TUI



PHP — server-side web language

See also PROFESSIONAL EXPERIENCES AS A WEB DEVELOPER.

2017 master project: see Python project *IMDb*

2013 – ... personal project:  *OPiCitations*

Online quotes dictionary: www.opimedia.be/OPiCitations

MySQL, PHP, HTML/Sass, JavaScript

2010 training project: **WHM** – Wiki Hyper Media

Final realization of *professional web developer training*: whm.opimedia.be

rewriting Apache, MySQL, PHP, XHTML/CSS

JS JavaScript — dynamic object language mainly used in web browsers

See also PROFESSIONAL EXPERIENCES AS A WEB DEVELOPER.

2020 personal project:  *mixed radix*

HTML/Sass/JavaScript application to convert representations of numbers from one mixed radix to another: www.opimedia.be/mixed-radix

2017 master project (17.5/20):  *Disjoint Compatible Perfect Matchings*

Illustration of a scientific article subject by a static web page in HTML/Sass, with a JavaScript application: www.opimedia.be/CV/2016-2017-ULB/INFO-F420-Computational-geometry/Project-Disjoint-Compatible-Perfect-Matchings/


2011 personal project: *txt2*

HTML/CSS/JavaScript application to apply various transformations to text data:
www.opimedia.be/DS/online-tools/txt2




Java — object-oriented language

See also Scala and Processing languages that running on Java virtual machine, and PROFESSIONAL EXPERIENCES AS A WEB DEVELOPER.

2017 master project (20/20):  *ChocoChess*

Solving **constraint satisfaction problems** (CSP) with *Choco solver* library.
<https://bitbucket.org/OPiMedia/choco chess>

Javadoc, JUnit, Choco solver


2016 personal and master project (14.5/20):  **Fortran compiler**

Development in Java of a compiler for a subset of Fortran. Lexical analysis using **JFlex**. Automatic generation from Fortran grammar of a parser written in Java, with a program developed in Python. Native code generation via LLVM assembly.

Java, JFlex, Python, LLVM

2014 project for MOOC *Creative, Serious and Playful Science of Android App* (20/20)

Adaptation for Android of the Processing project *No Cross Circles*.

2015 training *Java programming laboratory* project:  **RepairCenter**

Development of a web application in **Scrum** methodology, including the development of a Java library to automatize forms handling. Final presentation slides:

www.opimedia.be/CV/2015_Laboratoire_de_programmation_Java/RepairCenter.pdf


UML, Eclipse, **SVN (Subversion)**, MySQL Workbench, Tomcat, **Java EE**, JSP, JPA, Hibernate **ORM**, Javadoc, Scrum

1998 bachelor project: implementation of data structures




Processing — derived from **Java** for visual arts

2013 project for MOOC *Creative Programming for Digital Media & Mobile Apps* (20/20)

Visual and sound application  **No Cross Circles** producing MIDI sounds when discs touch each other: www.opimedia.be/DS/Processing/#No-Cross-Circles




2020 – ... ongoing personal project:  **slidesfromvideo**

Automatic extraction of slides from videos, using libraries **OpenCV** and **Pillow** (PIL)

2020 – ... ongoing personal project: **outcmp**

For a program and inputs, executes it and tests its outputs by comparing them to given outputs assumed to be correct; summarizes in a table

2018 – ... ongoing personal project:  **tsv2htmltable**

Python 3 application and library for converting text data such as TSV, CSV... into interactive HTML tables (or \LaTeX or other text data), with possibility of transformations by regular expressions (**regex**): <https://bitbucket.org/OPiMedia/tsv2htmltable>

Python 3, PyPy, **pytest**; HTML, DataTables, \LaTeX


2018 master project: see OpenCL project *L-systems*

2017 master project (15/20): BPP optimization problem

Implementation and analysis of heuristics to solve the *Bin Packing Problem* (BPP).

2017 master project (18/20): web application using the **large volume** of **IMDb data**

Extraction of data from *IMDb* cinema website with Python to feed a MySQL database. Dynamic web application: Apache HTTP Server, PHP, HTML/Sass.

2016 master project (20/20):  **p0ss1ble**

Interactive application with HTML visualization to break a set of messages that have been encrypted using the secure AES-128 CTR method, but whose misuse makes it fragile.

<https://bitbucket.org/OPiMedia/p0ss1ble>

2016 master project (11/20): data structure from a scientific article

Implementation of a persistent binary search tree.

Presentation slides of the structure: <https://speakerdeck.com/opimedia/persistent-search-trees>

2016 – 2019 EPFC programming competition in the past student category

Successively **first prize**, second prize, first prize, first prize and then first prize ex æquo.



Solution for 2019, with some theoretical developments:

<https://bitbucket.org/OPiMedia/epfc-contest-15-2019-le-lacher-de-boules-de-petanque>

2016 master project: see Java project *Fortran compiler*

2013, 2014 projects for MOOC **Discrete Optimization** (18.5/20):

Implementation of algorithms to solve discrete optimization problems: knapsack, graph coloring, traveling salesman, warehouse location, vehicle routing.


2013 – ... personal project:  **SimpleGUICS2Pygame**

Library reimplementing in **Python compatible 2 and 3** some APIs of specific modules (*SimpleGUI*...) written in JavaScript in the implementation of Python *CodeSkulptor*.

<https://simpleguics2pygame.readthedocs.io>

Users all over the world have contacted me, directly or indirectly for example by stackoverflow.com/search?q=SimpleGUICS2Pygame

Python 2, Python 3, **matplotlib**, **Pillow** (PIL), **pygame**, **pycodestyle** (pep8), **Pylint**, **mypy**, **pytype**, **pydeps**, **Sphinx**


2013 project for MOOC *An Introduction to Interactive Programming in Python (20/20)*:  **RiceRocks**

Small games in *CodeSkulptor* online environment, using *SimpleGUI* module:

https://py3.codeskulptor.org/#user305_XNvcqTxIBngtHPu.py


List of other programs:

https://simpleguics2pygame.readthedocs.io/en/latest/_static/links/prog_links.html

~ 2005 – 2009 personal project:  **DS** *DSPython*

Python 2 library implementing arithmetic functions, evaluation of combinators (**combinatory logic**), and **unlimited register machine (URM)**. Some Python/**Tkinter** applications using it.

www.opimedia.be/DS/DSPython

 **Julia** — dynamic language for scientific computation

2017 master project (17.5/20): linear programming problem *p-center location*

Implementation and analysis of several formalizations of this problem.

 **Scheme** — refined dynamic functional language


~2003 personal project: library implementing arithmetic functions

 **Erlang** — **concurrent** functional language based on the **actor** model

2018 master project (not completed):  **parallel** implementation of a scalable Twitter-like

<https://bitbucket.org/OPiMedia/mini-twitter-in-erlang>

 **Scala** — language mixing **object** and **functional** paradigms, running on **Java** virtual machine


2019 **master thesis** (15.5/20):  **Parallelization** of an **abstract interpreter**, through the **actor** model — Application to the *Scala-AM* abstract interpreter

Theoretical presentation of **abstract interpretation**, **static analysis** technique, i.e. technique to automate the proof of properties on programs or highlighting bugs, without executing these programs.

Theoretical presentation of parallel programming and especially of the actor model. A **parallel** program is designed to simultaneously perform several tasks distributed over several processors/cores. This is now the way to accelerate programs that today can no longer simply rely on the proper acceleration of processors. The **actor** model encapsulates these tasks in isolated entities that communicate by sending asynchronous messages. This reduces the difficulty, parallel programs are non-deterministic in nature and subject to many potential errors.

Practical implementation of several parallel algorithms in the existing *Scala-AM* abstract interpreter. Performance evaluation on the analysis of **Scheme** programs.

Master thesis:

 <https://bitbucket.org/OPiMedia/efficient-parallel-abstract-interpreter-in-scala/raw/master/Parallelisation-d-un-interpreteur-abstrait-au-travers-du-modele-acteur--Olivier-Pirson-2019.pdf>

Final presentation slides:


speakerdeck.com/opimedia/parallelisation-dun-interpreteur-abstrait-au-travers-du-modele-acteur

Scala-Par-AM implementation:  <https://bitbucket.org/OPiMedia/scala-par-am>

sbt, sbt-assembly, ScalaCheck, ScalaTest, **Akka**, **Scaladoc**; \LaTeX , TikZ, gnuplot, Zotero



Haskell — **pure functional** language, statically typed, with lazy evaluation

2018 master project (19/20):  *Explore the Desert*

Development of a game in console and graphic mode, with the software transactional memory (**STM**) **parallelism** model.

<https://bitbucket.org/OPiMedia/explore-the-desert-in-haskell>

GHC, Gloss, HUnit, Haddock



Prolog — **declarative** language, logical programming

2018 master project (16/20):  *English Linear System Solver*

Implementation of a linear system solver in natural language.

<https://bitbucket.org/OPiMedia/english-linear-system-solver-in-prolog>

LaTeX **L^AT_EX** — document composition language

2019 – ... ongoing personal project: **LaTeX** package set

~2005 – ... personal project: writing logical-mathematical documents

www.opimedia.be/docs-math

~ 2004 – 2014 personal project: set of packages and tools for **LaTeX**

LaTeX, PostScript, PSUtils, Makefile, Perl, Python

“the purpose of abstracting is not to be vague, but to create a new semantic level in which one can be absolutely precise.”

(Edsger W. DIJKSTRA, *The Humble Programmer*)

“Controlling complexity is the essence of computer programming.”


(Brian KERNIGHAN and P. J. PLAUGER, *Software Tools*)


Olivier PIRSON

Belgian, born in 1975

 www.linkedin.com/in/olivierpirson

 olivier.pirson.opi@gmail.com

 <https://europa.eu/!Gw99mX>

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$$\sum_{i=0}^n f(i)$$

`sum(f(i) for i in range(n))`

— **Mathematical sciences** (bachelor) — ... — **Computer science** (master) —

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