

Master of Sciences in Computer Science Track “Optimization in Operations Research”

University of Nantes, Ecole des Mines de Nantes

Welcome address 2016-2017

- 1 Introduction
- 2 Program and courses
- 3 Internship, Semester Abroad

- 1 Introduction
- 2 Program and courses
- 3 Internship, Semester Abroad

Who, what, where?

Responsibles:

- Master Computer Science:
Prof. Xavier Gandibleux (Office 121)
- Program, M2 ORO: **Dr. Anthony Przybylski** (Office 122)
- Internship: **Dr. Evgeny Gurevsky** (Office 122)
- EMN partner: **Dr. Fabien Lehuédé** (Office C018/EMN)

Secretary: ??? (Office 103)

International: **Mrs Christine Foucat** (Building 1, Bureau des Relations Internationales)

Contact by e-mail : firstname.lastname@univ-nantes.fr

Except for: fabien.lehuede@mines-nantes.fr

Website: <http://oro.univ-nantes.fr>

Who, what, where?

Responsibles:

- Master Computer Science:
Prof. Xavier Gandibleux (Office 121)
- Program, M2 ORO: **Dr. Anthony Przybylski** (Office 122)
- Internship: **Dr. Evgeny Gurevsky** (Office 122)
- EMN partner: **Dr. Fabien Lehuédé** (Office C018/EMN)

Secretary: ??? (Office 103)

International: **Mrs Christine Foucat** (Building 1, Bureau des Relations Internationales)

Contact by e-mail : firstname.lastname@univ-nantes.fr

Except for: fabien.lehuede@mines-nantes.fr

Website: <http://oro.univ-nantes.fr>

Map of the Faculty of Sciences

http://www.univ-nantes.fr/adminsite/photo.jsp?ID_PHOTO=75



Direction to the Ecole des Mines de Nantes (EMN)



Go to station MICHELET SCIENCES
Tram line 2 (direction ORVAULT
GRAND VAL)

Stop at station ECOLE CENTRALE

Go to bus stop ECOLE CENTRALE
Bus line E5 (or 75) (direction CAR-
QUEFOU)

Stop at bus stop POLYTECH (or
CHANTRERIE GRANDES ECOLES)

Total travel time: 35 minutes

ID Card

- Master of Sciences in Computer Sciences
Track “Optimization on Operations Research” (ORO)
- Graduated with **Research training** or **Applied training**
- The diploma is **shared with EMN** school of engineers
- Master program based on **strong regional scientific competences in optimization**
- Academic staff from **UN-FST, EMN, CNRS, UBS, UA, ULB**
- Built on two research laboratories: **LINA and IRCCyN**
- **Bilateral international agreements** with several institutions (BE, UK, DE, JP)

ID Card

- Master of Sciences in Computer Sciences
Track “Optimization on Operations Research” (ORO)
- Graduated with **Research training** or **Applied training**

- The diploma is **shared with EMN** school of engineers
- Master program based on **strong regional scientific competences in optimization**
- Academic staff from **UN-FST, EMN, CNRS, UBS, UA, ULB**
- Built on two research laboratories: **LINA and IRCCyN**
- **Bilateral international agreements** with several institutions (BE, UK, DE, JP)

ID Card

- Structured in **2 years**, i.e. **4 semesters**, S1, S2, S3, S4
- Courses at the **Faculty of Sciences, University of Nantes** and at the **EMN**
- **Lectures in English** S3
- **Research** or **Applied Internship** during semester S4
- ~~Semester **S2 or S4 abroad** mandatory~~

“Specific” Equipment for the Master ORO

Classroom Info2 “dedicated” to the Master ORO

- TP ORO M1 and M2
- Projects (practice courses)

Environment

- Desktops under linux, laser printer
- Optimization software
- Reference books used in your courses

On the website of the University of Nantes

Unique ID and password for all services!

- Intranet: <http://www.univ-nantes.fr> and next click on “intranet” (up-right of the screen)
- Webmail: <https://webmail.etu.univ-nantes.fr>
- Madoc : <http://madoc.univ-nantes.fr>
- Official time schedule:
<https://edt.univ-nantes.fr/sciences>
- Unofficial time schedule (no password required, first week):
<http://oro.univ-nantes.fr/emploi-du-temps/time-schedule-m2-oro>

- 1 Introduction
- 2 Program and courses
- 3 Internship, Semester Abroad

Semester 3: Program

| Code | Course | Lecturer(s) | Hours |
|---------|---------------------------------|---|----------------|
| X9IO010 | Large scale Optimisation | Marc Sevaux André Rossi | 13h CM, 13h TD |
| X9IO020 | Discrete Constraint Programming | Nicolas Beldiceanu | 13h CM, 13h TD |
| X9IO030 | Global Optimization | Laurent Granvilliers | 13h CM, 13h TD |
| X9IO040 | Black-box Optimization | Alexandre Goldsztejn, Christophe Jermann | 13h CM, 13h TD |
| X9IO050 | Multi-Objective Optimization | Anthony Przybylski | 13h CM, 13h TD |
| X9IO060 | Multi-Objective MetaHeuristics | Xavier Gandibleux | 13h CM, 13h TD |
| X9IO070 | Transportation and Logistics | Fabien Lehuédé | 13h CM, 13h TD |
| X9IO080 | Planning and scheduling | Odile Morineau | 13h CM, 13h TD |
| X9IO090 | Bioinformatics | Irena Rusu, Guillaume Fertin | 13h CM, 13h TD |
| X9IO100 | OR Special Topic II | Evgeny Gurevsky | 13h CM, 13h TD |
| X9IO110 | Conferences | Jean-Xavier Rampon, Xavier Gandibleux | 13h CM, 13h TD |

Evaluation in **continuous control** for all courses

Semester 3: First Week

sciences 2016-2017



emploi du temps groupe M2ORO - Optimisation en Recherche Opérationnelle (Sem 36)

| | 08:00 | 09:00 | 09:00 | 10:00 | 10:00 | 11:00 | 11:00 | 12:00 | 12:00 | 13:00 | 13:00 | 14:00 | 14:00 | 15:00 | 15:00 | 16:00 | 16:00 | 17:00 | 17:00 | 18:00 | |
|-------------------------------|-------|-------|-------|--|-------|-------|--|-------|-------|-------|-------|-------|--|-------|-------|-------|-------|-------|-------|-------|--|
| lundi 05/09/2016 | | | | CM INFO, 09:30-10:50, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle visio U2 (Bât 2) 13-13-0 - salle info 2 non disponible - salle à badge | | | TD INFO, 11:00-12:20, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle visio U2 (Bât 2) 13-13-0 - salle info 2 non disponible | | | | | | | | | | | | | | |
| mardi 06/09/2016 | | | | CM INFO, 09:30-10:50, Sem 36 X9IO030 Global Optimization M2ORO GRANVILLIERS, Laurent salle info 2-vidéo (Bât 2) 13-13-0 | | | TD INFO, 11:00-12:20, Sem 36 X9IO030 Global Optimization M2ORO GRANVILLIERS, Laurent salle info 2-vidéo (Bât 2) 13-13-0 | | | | | | TD INFO, Sem 36 X9IO110 Conferences M2ORO RAMPON, Jean-Xavier sa TD U1-Vidéo (Bât 2) 0-26-0 - salle à badge | | | | | | | | |
| mercredi 07/09/2016 | | | | CM INFO, 09:30-10:50, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle info 2-vidéo (Bât 2) 13-13-0 | | | TD INFO, 11:00-12:20, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle info 2-vidéo (Bât 2) 13-13-0 | | | | | | | | | | | | | | |
| jeudi 08/09/2016 | | | | CM INFO, 09:30-12:20, Sem 36 X9IO090 Bioinformatics M2ORO RUSU-ROBINI Ines sa TD U1-Vidéo (Bât 2) 13-13-0 - salle à badge | | | | | | | | | TD INFO, Sem 36 X9IO110 Conferences M2ORO RAMPON, Jean-Xavier sa TD U1-Vidéo (Bât 2) 0-26-0 - salle à badge | | | | | | | | |
| vendredi 09/09/2016 | | | | CM INFO, 09:30-10:50, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle info 2-vidéo (Bât 2) 13-13-0 | | | TD INFO, 11:00-12:20, Sem 36 X9IO050 Multi-Objective Optimization M2ORO PRZYBYLSKI Anthony salle info 2-vidéo (Bât 2) 13-13-0 | | | | | | | | | | | | | | |

Semester 3: Typical Time Schedule

sciences 2016-2017



emploi du temps groupe M2ORO - Optimisation en Recherche Opérationnelle (Sem 40)

| | 08:00 | 09:00 | 09:00 | 10:00 | 10:00 | 11:00 | 11:00 | 12:00 | 12:00 | 13:00 | 13:00 | 14:00 | 14:00 | 15:00 | 15:00 | 16:00 | 16:00 | 17:00 | 17:00 | 18:00 | | | | | | |
|-------------------------------|--|-------|-------|--|-------|-------|--|-------|-------|-------|-------|-------|---|-------|-------|--|-------|-------|-------|-------|--|--|--|--|--|--|
| lundi 03/10/2016 | CM INFO, 08:00-12:20, Sem 40 X9IO070 Transportation and Logistics M2ORO LEHUEDE Fabien salle extérieure 13-13-0 - CM/TD - cours à l'École des Mines de Nantes - salle - en attente précisions | | | | | | | | | | | | CM INFO, 14:00-17:20, Sem 40 X9IO020 Discrete Constraint Programming M2ORO BELDICEANU Nicolas salle extérieure 13-13-0 - cours à l'École des Mines de Nantes - salle - en attente précisions | | | | | | | | | | | | | |
| mardi 04/10/2016 | | | | CM INFO, 09:30-10:50, Sem 40 X9IO030 Global Optimization M2ORO GRANVILLIERS, Laurent salle info 2-vidéo (Bât 2) 13-13-0 | | | TD INFO, 11:00-12:20, Sem 40 X9IO030 Global Optimization M2ORO GRANVILLIERS, Laurent salle info 2-vidéo (Bât 2) 13-13-0 | | | | | | CM INFO, 14:00-15:20, Sem 40 X9IO100 OR Special Topic II M2ORO GUREVSKY Evgeny sa TD U1-Vidéo (Bât 2) 13-13 - en attente précisions - salle à badge | | | TD INFO, 15:30-16:50, Sem 40 X9IO100 OR Special Topic II M2ORO GUREVSKY Evgeny sa TD U1-Vidéo (Bât 2) 13-13 - en attente précisions - salle à badge | | | | | | | | | | |
| mercredi 05/10/2016 | | | | CM INFO, 09:30-10:50, Sem 40 X9IO060 Multi-Objective Metaheuristics M2ORO GANDIBLEUX, Xavier salle info 2-vidéo (Bât 2) 13-13-0 - conflit enseignant semaines 40-43 | | | TD INFO, 11:00-12:20, Sem 40 X9IO060 Multi-Objective Metaheuristics M2ORO GANDIBLEUX, Xavier salle info 2-vidéo (Bât 2) 13-13-0 - conflit enseignant semaines 40-43 | | | | | | CM INFO, 14:00-15:20, Sem 40 X9IO040 Black-box Optimization M2ORO JERMANN, Christophe salle info 2-vidéo (Bât 2) 13-13-0 | | | TD INFO, 15:30-16:50, Sem 40 X9IO040 Black-box Optimization M2ORO JERMANN, Christophe salle info 2-vidéo (Bât 2) 13-13-0 | | | | | | | | | | |
| jeudi 06/10/2016 | | | | CM INFO, 09:30-12:20, Sem 40 X9IO090 Bioinformatics M2ORO RUSU-ROBINI Irena sa TD U1-Vidéo (Bât 2) 13-13-0 - salle à badge | | | | | | | | | | | | | | | | | | | | | | |
| vendredi 07/10/2016 | | | | CM INFO, 09:30-10:50, Sem 40 X9IO010 Large scale optimization M2ORO ROSSI André; SEVAUX Marc sa TD U1-Vidéo (Bât 2) 13-13-0 - salle à badge | | | TD INFO, 11:00-12:20, Sem 40 X9IO010 Large scale optimization M2ORO ROSSI André; SEVAUX Marc sa TD U1-Vidéo (Bât 2) 13-13-0 - salle à badge | | | | | | CM INFO, 14:00-16:50, Sem 40 X9IO080 Planning and Scheduling M2ORO MORINEAU Odile salle extérieure 13-13-0 - cours à l'École des Mines - salle - en attente précisions | | | | | | | | | | | | | |

Validation

| Code | Course | Coefficient (Mean) | ECTS |
|---------|---------------------------------|--------------------|------|
| X9IO010 | Large scale Optimisation | 3 | 3 |
| X9IO020 | Discrete Constraint Programming | 3 | 3 |
| X9IO030 | Global Optimization | 3 | 3 |
| X9IO040 | Black-box Optimization | 3 | 3 |
| X9IO050 | Multi-Objective Optimization | 3 | 3 |
| X9IO060 | Multi-Objective MetaHeuristics | 3 | 3 |
| X9IO070 | Transportation and Logistics | 3 | 3 |
| X9IO080 | Planning and scheduling | 3 | 3 |
| X9IO090 | Bioinformatics | 3 | 3 |
| X9IO100 | OR Special Topic II | 2 | 2 |
| X9IO110 | Conferences | 1 | 1 |
| X0II010 | Internship | 10 | 30 |

Necessary to obtain a mean of at least 10 for **both** semesters.
 No compensation between semesters!

Validation M2 ORO in case of double registration GOPL-ORO

Same conditions for validation but with some equivalences

- Pilotage de la production → Planning and scheduling
- Management de la supply chain → Black-box optimization
- Projet d'option → Global optimization
- Projet d'option → Bioinformatics
- SSG : Management stratégique des organisations → OR
Special Topic II, Conference
- Projet de Fin d'Etude → Internship

Obtained notes are rescaled

① Introduction

② Program and courses

③ Internship, Semester Abroad

Main Procedure

- ① Find an internship for 5 - 6 months
 - Research: University, Laboratory or Research Center
 - Applied: Enterprise
- ② Send the subject to Evgeny Gurevsky for validation
- ③ If abroad: contact Christine FOUCAT to candidate for funding

Examples of companies for an applied internship

① France

- Air France, EDF, GDF, ILOG, Thalès, Alcatel, France Télécom, Google (Paris)

② Abroad

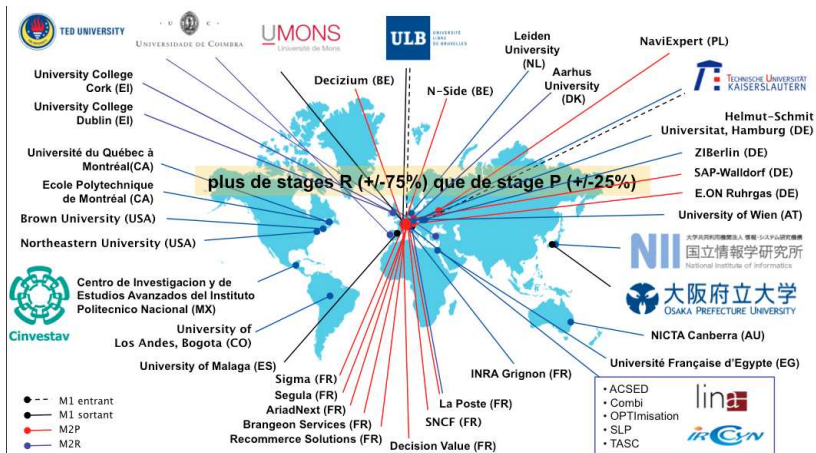
- Decizium, N-side, OM Partners (Belgium), NaviExpert (Poland), Maximal Software (UK), Google (Dublin)

Domains for a research internship

- ① Mathematical Programming
- ② Multiobjective Optimization
- ③ Global Optimization
- ④ Constraint Programming
- ⑤ Graphs and Algorithms
- ⑥ Meta-heuristics
- ⑦ Production, transportation, logistic
- ⑧ Bio-informatics

Suggestion: find at least 3 propositions for October in order to choose one for December.

The map of partners



Potential financial support for abroad

① **Envoléo (Pays de la Loire) – World**

- To be at least one year before at the University from "Pays de la Loire"
- Amount: 1000 euros/stay
- < 30 years old

② **Erasmus (research or enterprise) – Europe**

- Amount: 310 - 370 euros/month

Other Potential financial support

① Allocation AMI – World

- Amount: 400 euros/month
- Social criteria + without Erasmus

② Allocation Jules Verne – World

- You have no support
- Amount: 100 - 150 euros/month

Total financial support can not be greater than 650 euros/month

Already available propositions

- ① **SEGULA (Cherbourg)**
 - Optimization aspects for Naval Applications
- ② **SNCF (Paris)**
 - MILP for on-line train localisation in Montparnasse
- ③ **Eurobios (Cachan)**

Important dates

- ① **10 january:** the deadline for the administration procedure
- ② **1 february:** beginning of your internship
- ③ **15 June:** sending to Evgeny Gurevsky your M.S. Thesis
- ④ **1 and 2 July:** defense of your M.S. Thesis (video-conference is possible)