Master in Computer Vision *Barcelona*

Academic year 2021-2022

Welcome Session & Master presentation

pagines.uab.cat/mcv

Maria Vanrell

Welcome session

1. About the Master
2. About the Partners
    - The UAB-CVC
    - The UOC
    - The UPC
    - The UPF
3. About the Students

Aim of the Master in Computer Vision

To give to the students **updated knowledge** about Computer Vision,

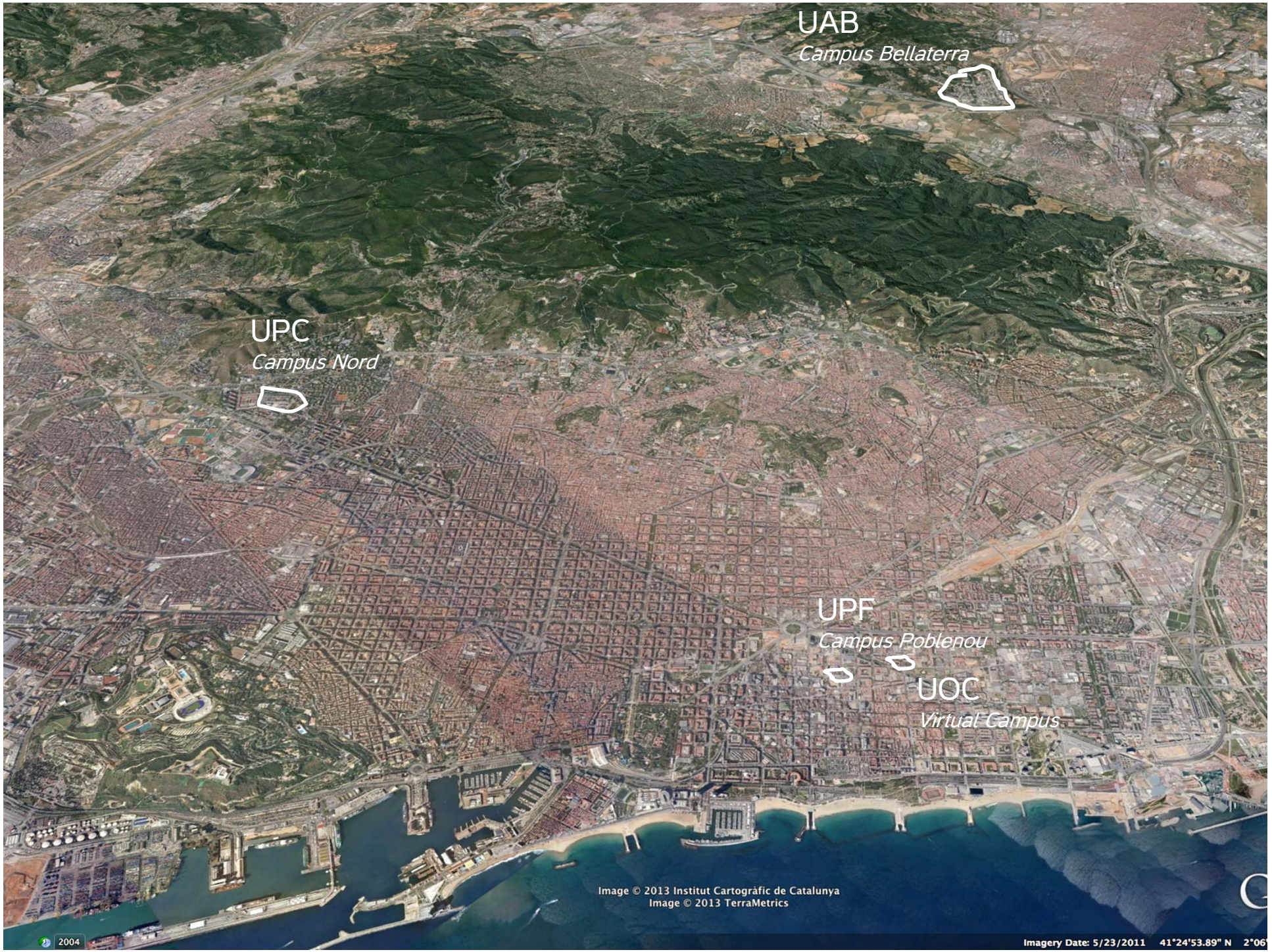
from basic techniques to state-of-art algorithms

that is an **emerging technology** whose development and applicability to different fields is exponentially growing since the last 2 decades

new jobs, start-up opportunities, Phd studentships

By **joining 4 groups of experts** in the filed which are living in Barcelona

a big concentration of expertise in a singular place


UAB
Campus Bellaterra
UPC
Campus Nord
UPF
Campus Poblenou
UOC
Virtual Campus
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UAB
Campus Bellaterra

Administration
Escola d'Enginyeria

Computer Vision Center

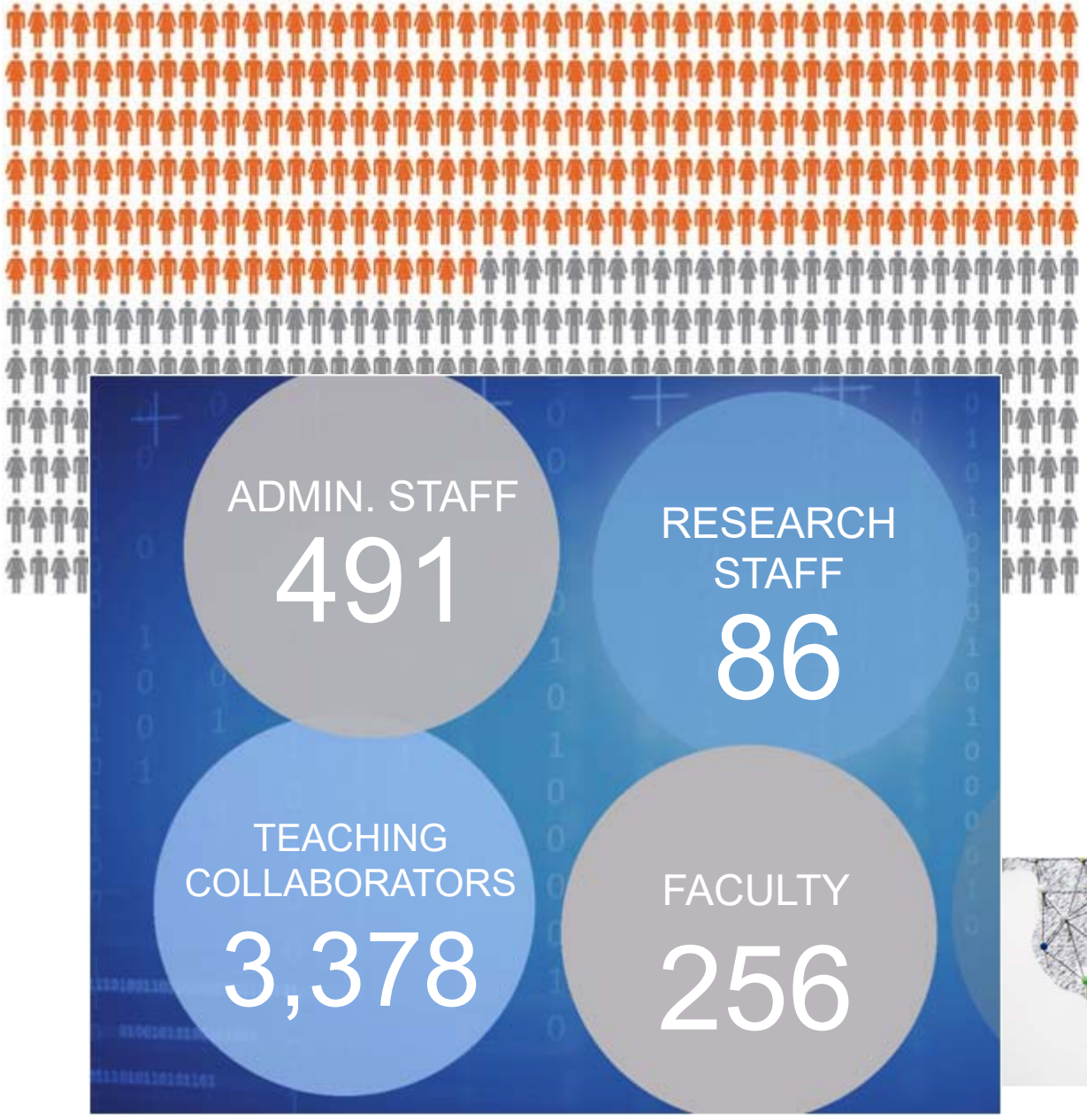
UPC
Campus Nord


Capes
UPF
Campus Poblenou

UOC

22@ Building

A community of more than 60,000 students



41,784
graduates

60,096
students

UOC
Virtual Campus

MCV is 1 year Official Master of 60 ECTS

Integrated in the **EEES** *(European Space of Superior Education)*

organized with the **ECTS** *(European Credit Transfer System)*

ECTS establishes the dedication of the student

1 ECTS = 25 Hours of student work

MCV workload distribution:

On-site modules (M1 to M6)	On-lines modules (M7, M8)
5 h. on-site (20% approx.) 20 h. homework (80% approx.)	100 % homework

MCV structure:

	Modules	ECTS	Univ.
M1	Introduction to human and CV	6	UPC
M2	Optimization and Inference techniques for CV	6	UPF
M3	Machine Learning techniques for CV	6	UAB
M4	3D Vision	6	UPC
M5	Visual Recognition	6	UAB
M6	Video Analysis	6	UPF
M7	Introduction to Research Dissemination	6	UOC
M8	Research and Technology Transfer Management	6	UOC
M9	Master Dissertation	12	ALL
	Total:	60	

	Modules	ECTS	Univ.
M1	Introduction to human and CV	6	UPC
M2	Optimization and Inference techniques for CV	6	UPF
M3	Machine Learning techniques for CV	6	UAB
M4	3D Vision	6	UPF
M5	Visual Recognition	6	UAB
M6	Video Analysis	6	UPC

Hybrid (online-inperson) at UAB/UPC/UPF

	Modules	ECTS	Univ.
M7	Introduction to Research Dissemination	6	UOC
M8	Research and Technology Transfer Management	6	UOC

On-line at UOC

	Modules	ECTS	Univ.
M9	Master Dissertation	12	ALL

Under supervision

	Modules	ECTS	Univ.
M1	Introduction to human and CV	6	UPC
M2	Optimization and Inference techniques for CV	6	UPF
M3	Machine Learning techniques for CV	6	UAB

Basic Techniques
(Hybrid: online-inperson)
Project-based

M4	3D Vision	6	UPC
M5	Visual Recognition	6	UAB
M6	Video Analysis	6	UPF

Vision Problems
(Hybrid: online-inperson)
Project-based

	Modules	ECTS	Univ.
M7	Introduction to Research Dissemination	6	UOC
M8	Research and Technology Transfer Management	6	UOC

Transversal skills
(online)

	Modules	ECTS	Univ.
M9	Master Dissertation	12	ALL

Final Project
(under supervision)
Academic or
at a Company

	Modules	ECTS	Univ.	
M1	Introduction to human and CV	6	UPC	Basic Techniques (Hybrid: online-inperson) Project-based
M2	Optimization and Inference techniques for CV	6	UPF	
M3	Machine Learning techniques for CV	6	UAB	
M4	3D Vision	6	UPC	Vision Problems (Hybrid: online-inperson) Project-based
M5	Visual Recognition	6	UAB	
M6	Video Analysis	6	UPF	
M7	Introduction to Research Dissemination	6	UOC	Transversal skills (online)
M8	Research and Technology Transfer Management	6	UOC	
M9	Master Dissertation	12	ALL	Final Project (under supervision) Academic or at a Company

FULL TIME option

October – November	December – February	March – April	May – July (September)
M1. Introduction to human and CV	M3. Machine Learning techniques for CV	M5. Visual Recognition	
M2. Optimization and Inference techniques for CV	M4. 3D Vision	M6. Video Analysis	
M7. Introduction to Research Dissemination		M8 Research and Technology Transfer Management	
			M9. Master Dissertation

PART TIME option

1st YEAR:

October	November	December	February	March	April	May	July (September)
M1. Introduction to human and CV		M3. Machine Learning techniques for CV		M5. Visual Recognition			
M7. Introduction to Research Dissemination				M8 Research and Technology Transfer Management			

2nd YEAR:

October	November	December	February	March	April	May	July (September)
M2. Optimization and Inference techniques for CV		M4. 3D Vision		M6. Video Analysis			
M9. Master Dissertation							

SCHEDULE

Time	Monday	Tuesday	Wednesday	Thursday
16h-17h	M1 / 3 / 5	M2 / 4 / 6	M1 / 3 / 5	M2 / 4 / 6
17h-18h	M1 / 3 / 5	M2 / 4 / 6	M1 / 3 / 5	M2 / 4 / 6
18h-19h	Project M1/3/5			Project M2/4/6

Module Coordinators:

Module 1. Introduction to Human & Computer Vision

Philippe Salembier

Module 2. Optimization and Inference techniques for CV

Coloma Ballester

Module 3. Machine Learning for CV

Ramon Baldrich

Module 4. 3D Vision

Gloria Haro

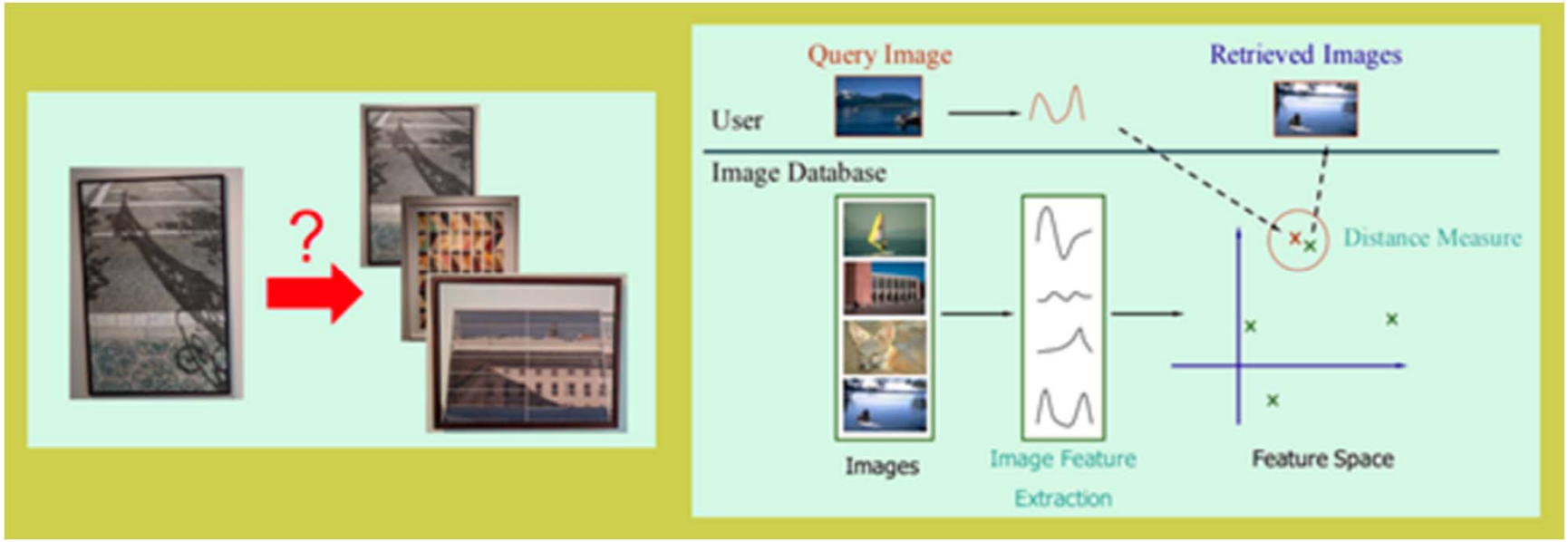
Module 5. Visual Recognition

Joan Serrat

Module 6. Video Analysis

Xavier Giró

Project 1. Museum Painting Retrieval



Project 2. Removing Objects in Natural and Urban Scenes

Picture from: Komodakis and Tziritas, IEEE Trans Image Proc, 2007

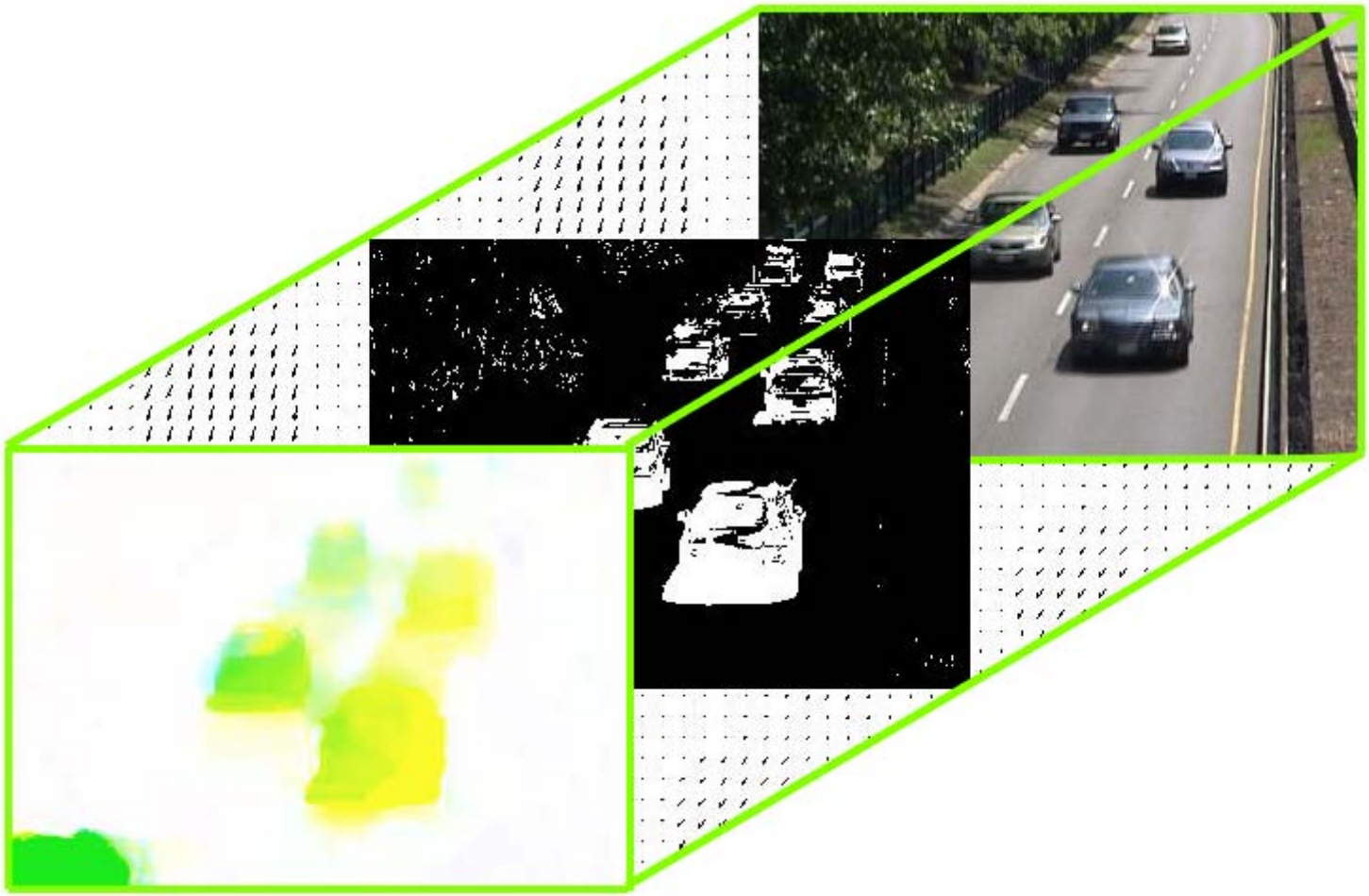
Project 3. Image Classification

Project 4. 3D recovery of urban scenes

The two central images are from Hiep et al. "Towards high-resolution large-scale multi-view stereo", CVPR 2009

Project 5. Deep Learning for Classification, Detection and Segmentation

Project 6. Road Traffic Monitoring



Project coordinators

Project 1. Museum Painting Retrieval

Ramon Morros / Verónica Vilaplana

Project 2. Removing Objects in Natural Scenes

Karim Lekadir

Project 3. Image Classification

Ramon Baldrich

Project 4. 3D recovery of urban scenes

Gloria Haro

Project 5. Deep Learning for Classification, Detection and Segmentation

Ernest Valveny

Project 6. Road Traffic Monitoring

Javier Ruiz / Xavier Giró

Teaching Methodology:

Supervised Sessions on-site

- **Lecture Sessions**, where the lecturers will explain general contents about the topics. Some of them will be used to solve the problems.

- **Project follow-up Sessions**, where the problems and goals of the projects will be presented and discussed, students will interact with the project coordinator about problems and ideas on solving the project (approx. 1 hour/week)

- **Presentation Session**, where the students give an oral presentation about how they have solved the project and a demo of the results.

- **Exam Session**, where the students are evaluated individually. Knowledge achievements and problem-solving skills

Homework, student will work in **groups** to solve the problems of the projects with deliverables:

- Code
- Reports
- Oral presentations

Evaluation:

The final marks for modules M1-M6 are computed with a formula, such as:

Final Mark = 0,4 x Exam + 0,55 x Project + 0,05 x Attendance

Exam: is the mark obtained in the Module Exam (must be equal or greater than 3)

Attendance: is the mark derived from the control of attendance at lectures (must be at least 70%)

Project: is the mark provided by the project coordinator based on the weekly control of the project through the project sessions and deliverables accordingly with specific criteria of the projects, such as:

- Participation in discussion sessions and in team work **(intra-group evaluations)**
- Mandatory and optional exercises
- Code development (style, comments, etc.)
- Report (justification of the decisions in your project development)
- Presentation (Talk and demonstrations on your project.

Special Exercises can allow you to get extra points ot increase the Exam Mark, but only if Exam Mark is greater than 3.

Evaluation for modules M7 and M8

Coordinators: David Merino and Carles Ventura

M7 module mark is based on **5 different activities:**

- Scientific text editing using LaTeX (20%)
- Oral presentations (40%).
- Writing style (20%)
- Ethics in Research (10%).
- Research dissemination tools (10%)

M8 module mark is based on **6 different activities:**

- Enterpreneurship (40%)
- Public funding (10%)
- Intellectual property (10%)
- Data analysis (20%)
- Project planning (10%)
- Review of the state-of-the-art (10%)
- Bibliographical review of own project (20%)

Deliverables: Reports and Videos of Oral presentations in M1 and M3

M9 Coordinators:

(UAB) M. Vanrell & R. Baldrich
(UOC) X. Baró
(UPC) J.R.Casas & E. Sayrol
(UPF) Coloma Ballester

Evaluation of **M9** module, **Master's Dissertation**, is evaluated according to the following criteria:

- Research performed according to the initial hypothesis.
- Defense of the work in a viva with a **Committee of 3 members**
- **Report of the research work** (Article format, less than 30 pages)
- Reported Conclusions
- **Supervisor evaluation**

Lecturers assessments

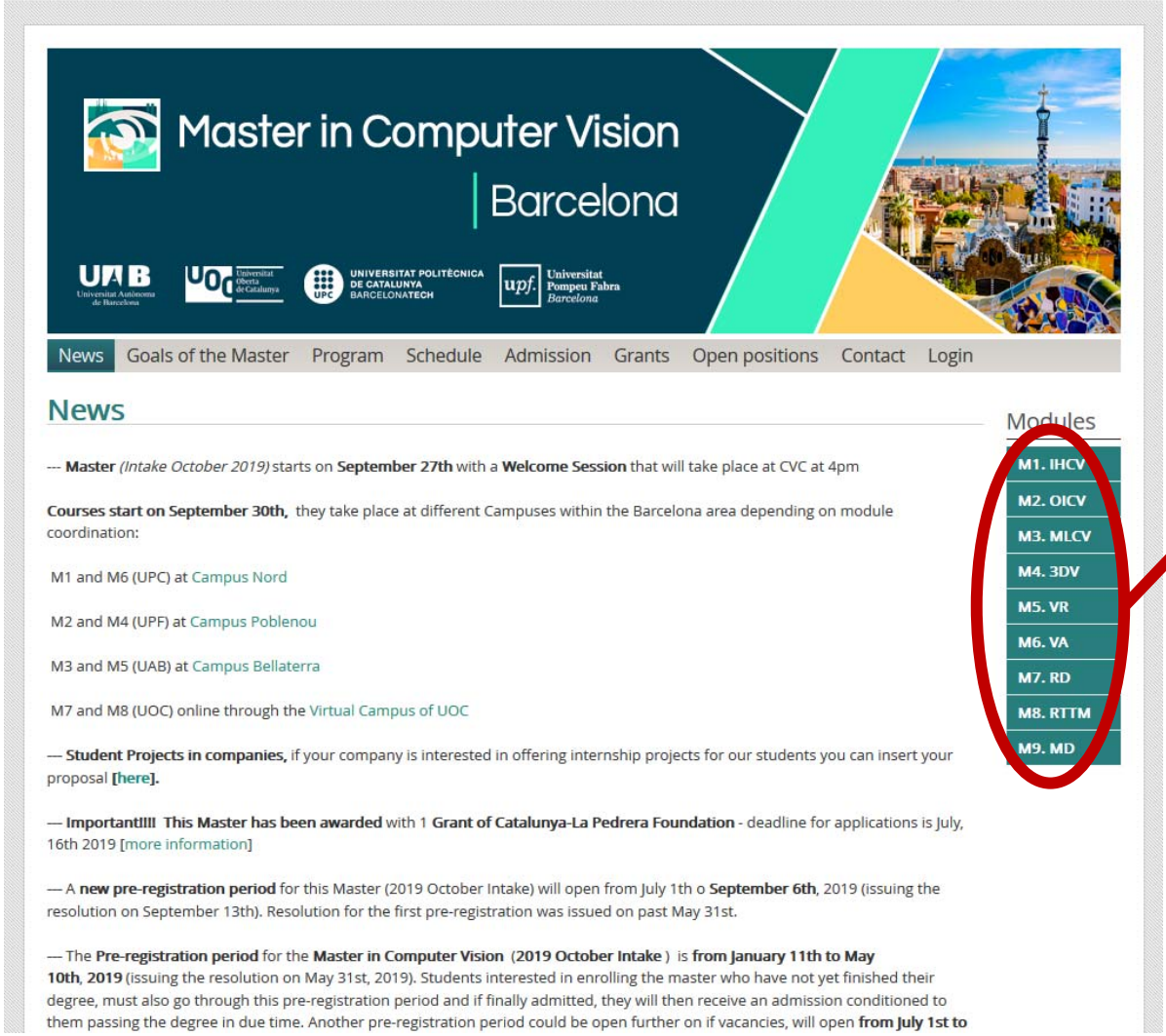
We will ask you for some help in improving the master

For each module we will ask you to fill an assessment about all the lecturers of the courses you attended.

Practical Issues

Schedule, News and Shared data:

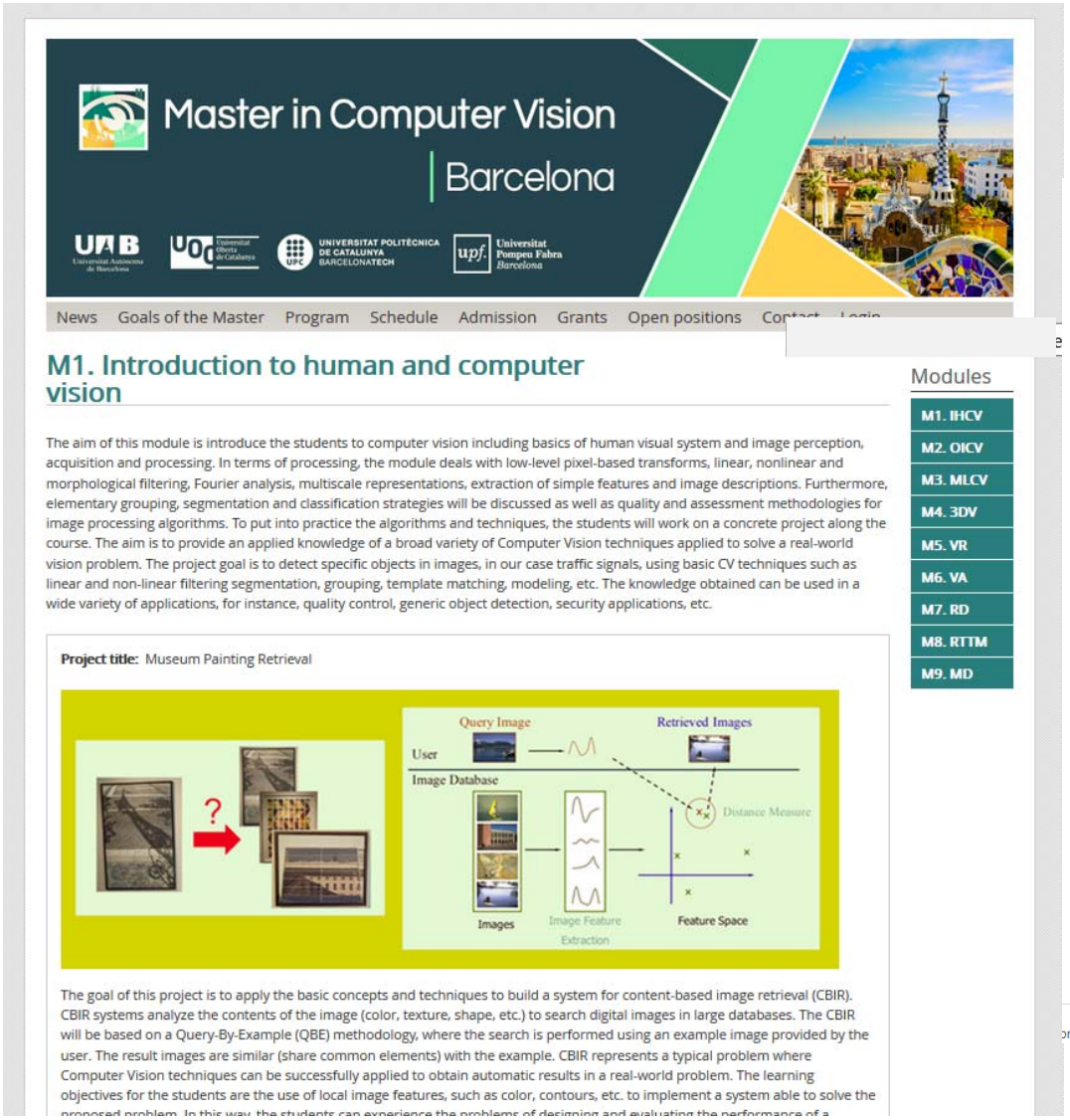
pagines.uab.cat/mcv



Practical Information about the modules:

Agenda, schedule, rooms

Module Information



Module Schedule

Building and Room

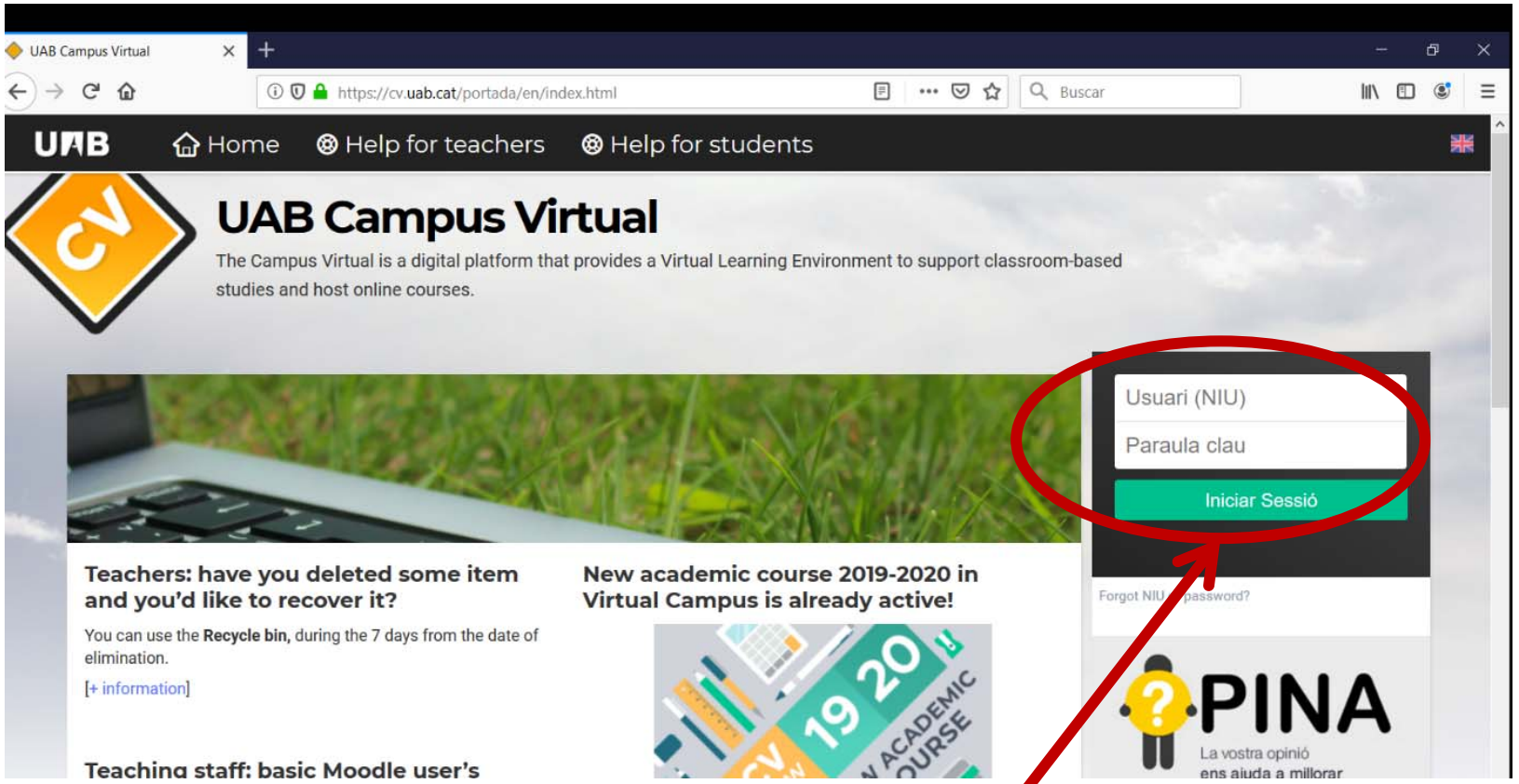
Module lectures:

Academic year 2021-2022/ M1 Student Guide here

Week	Date	Time	Lecture	Lecturer	University
1	Mon.Oct.4th	16h-18h	Human Visual system and perception	Javier Vázquez	UPC-Campus: A2-104
1	Mon.Oct.4th	18h-19h	Project Introduction	R.Morros/ V.Vilaplana	UPC-Campus: A2-104
1	Wed.Oct.6th	16h-18h	Image formation and color representation	Javier Vázquez	https://meet.google.com/xiv-rxcp-jiv
2	Mon.Oct.11th	16h-18h	Image processing assessment and pixel-based processing	Philippe Salembier	UPC-Campus: A2-104
2	Mon.Oct.11th	18h-19h	Project follow-up	R.Morros/ V.Vilaplana	UPC-Campus: A2-104
2	Wed.Oct.13rd	16h-18h	Morphological and nonlinear filtering	Philippe Salembier	https://meet.google.com/xiv-rxcp-jiv
3	Mon.Oct.18th	16h-18h	HOMEWORK		
3	Mon.Oct.18th		HOMEWORK		
3	Wed.Oct.20th	16h-18h	Space-frequency representation, Fourier transform and linear filtering (I)	Javier Ruiz	https://meet.google.com/xiv-rxcp-jiv
4	Mon.Oct.25th	16h-18h	Space-frequency representation, Fourier transform and linear filtering (II)	Javier Ruiz	UPC-Campus: A2-104
4	Mon.Oct.25th	18h-19h	Project follow-up	R.Morros/ V.Vilaplana	UPC-Campus: A2-104
4	Wed.Oct.27th		Space-frequency representation, Fourier	Javier Ruiz	https://meet.google.com/xiv-

Link to Virtual Room

Moodle Rooms for M1, M2, … M6 and M9 at UAB Campus Virtual: cv.uab.cat



NIU / Password

About UAB e-mail address

IMPORTANT

You can access your account at:

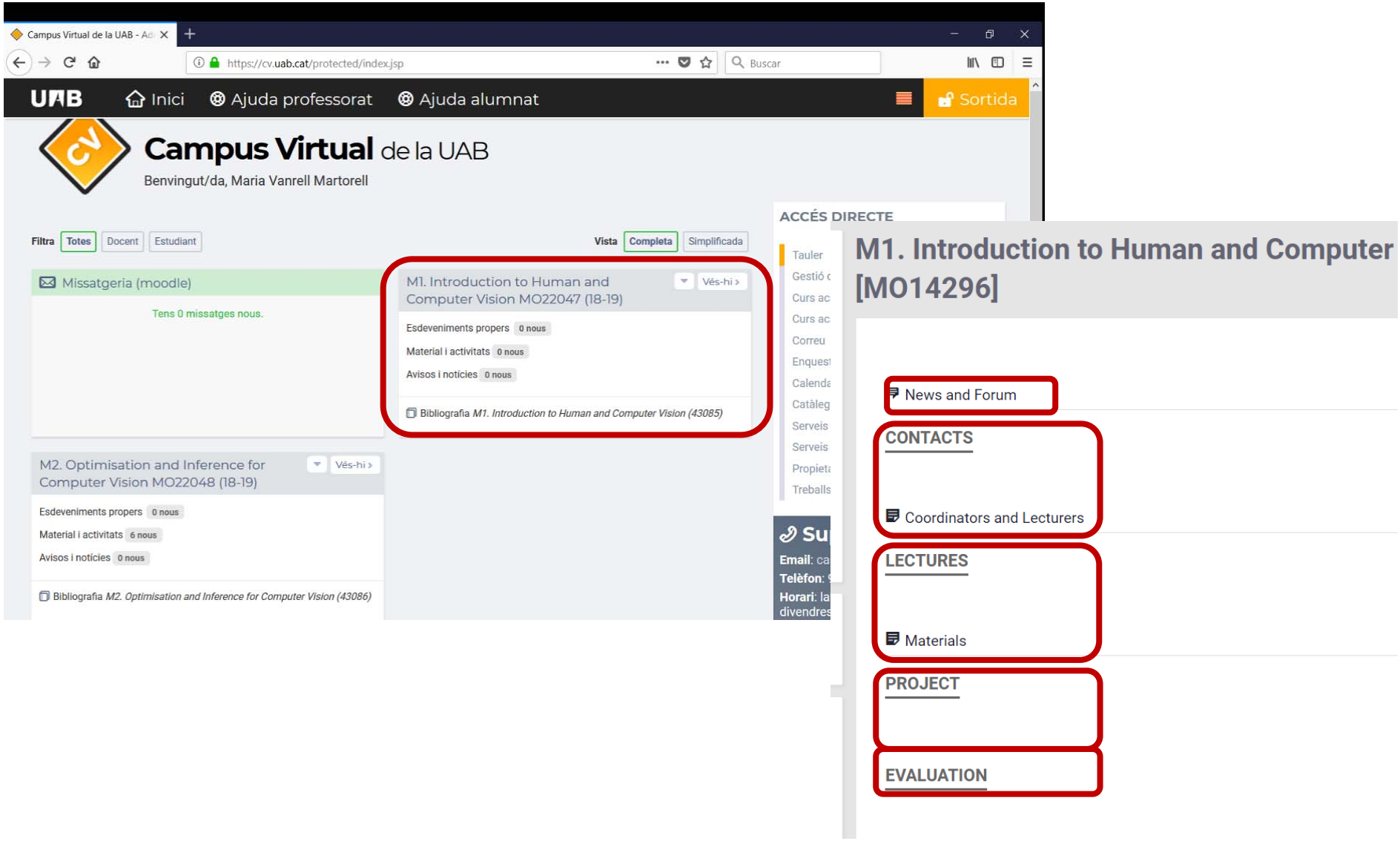
https://e-campus.uab.cat/

with the UAB NIU and password

Once logged in, you should

- go to the top right of the icon "**gear**"
- click on "**settings**"
- Select "**Forwarding and POP / IMAP**"
- you must activate the option "**Forward**"
- add the address where you want to receive the UAB emails

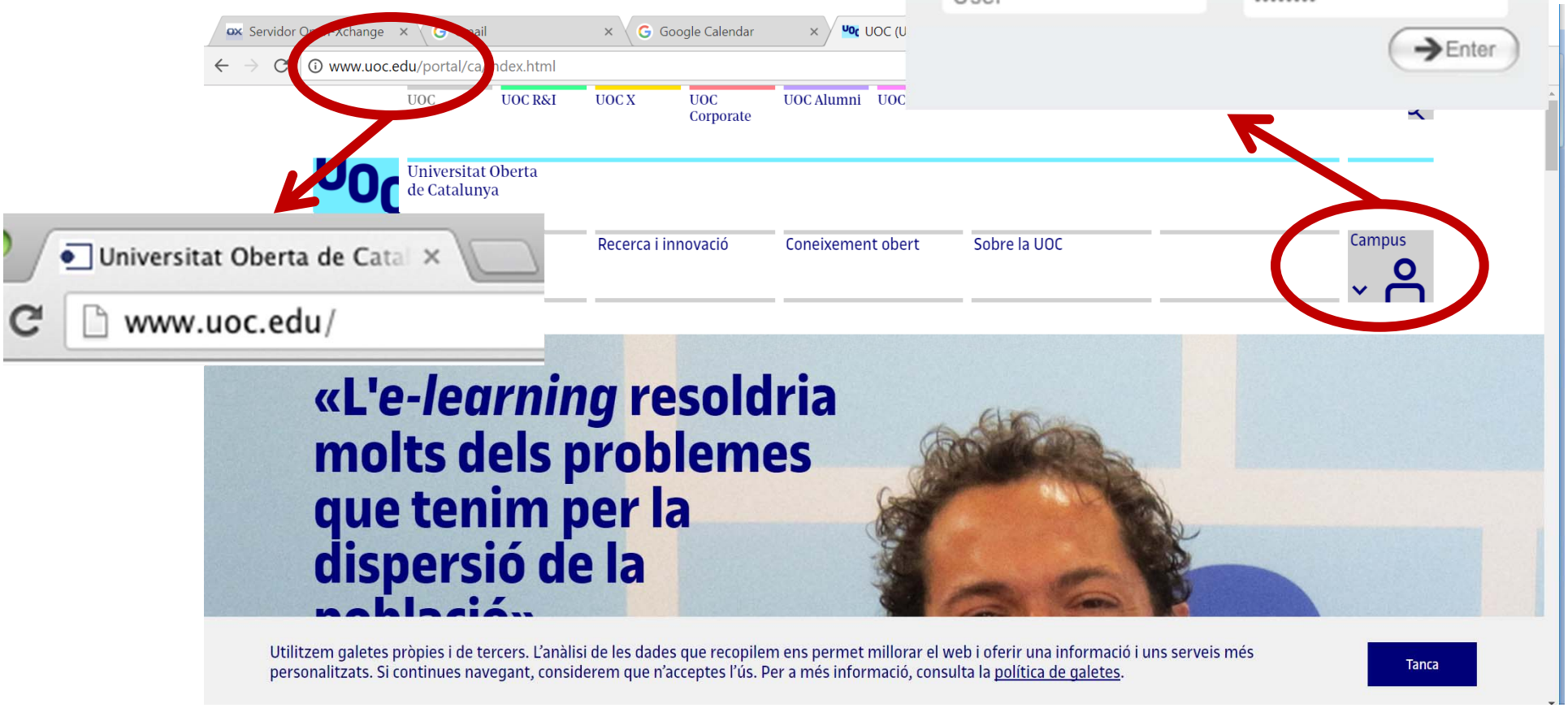
Moodle Rooms for M1, M2, … M6 and M9



UOC Virtual Campus for M7 and M8

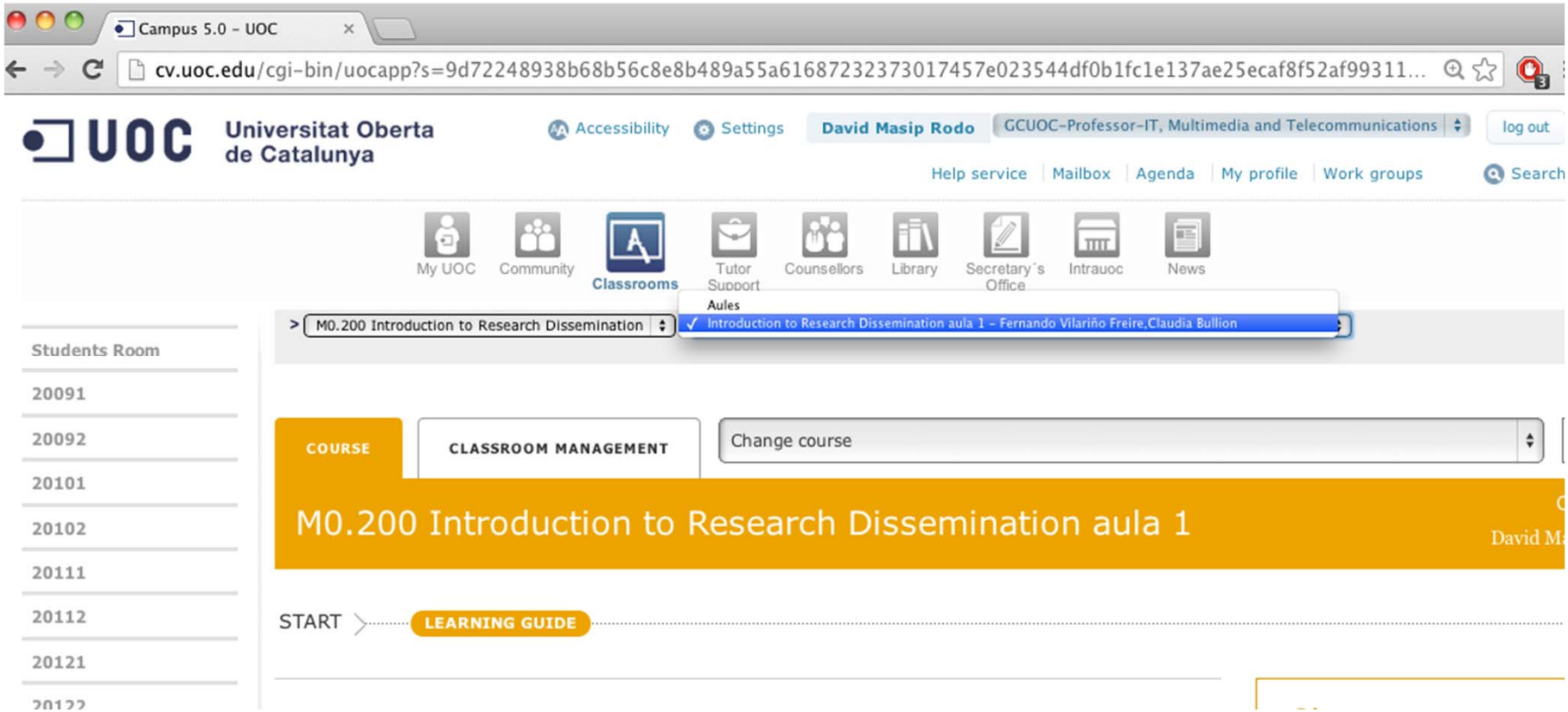
You Will receive your login information from UOC at your contact e-mail given to UAB

They are different from the UAB NIU/password!!!



Important: M7 course starts on October 20th

UOC Moodle rooms for M7 and M8



TO be more linked…

We will ask you to join us at **social/professional networks**

Become a Fan
Publications related to MCV

As a MCV data base

Additionally, you can use a desk for your homework at CVC

In the basement …

To prepare your Access to CVC
Please, contact Mrs. Mireia Martin (mmartin@cvc.uab.cat)

M9 . Master's Dissertation

Guideline for the students at the website page M9

Companies and institutions that hosted our students in the past:

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