



Master in Computer Vision *Barcelona*



Academic year 2021-2022
Welcome Session & Master presentation
pages.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,

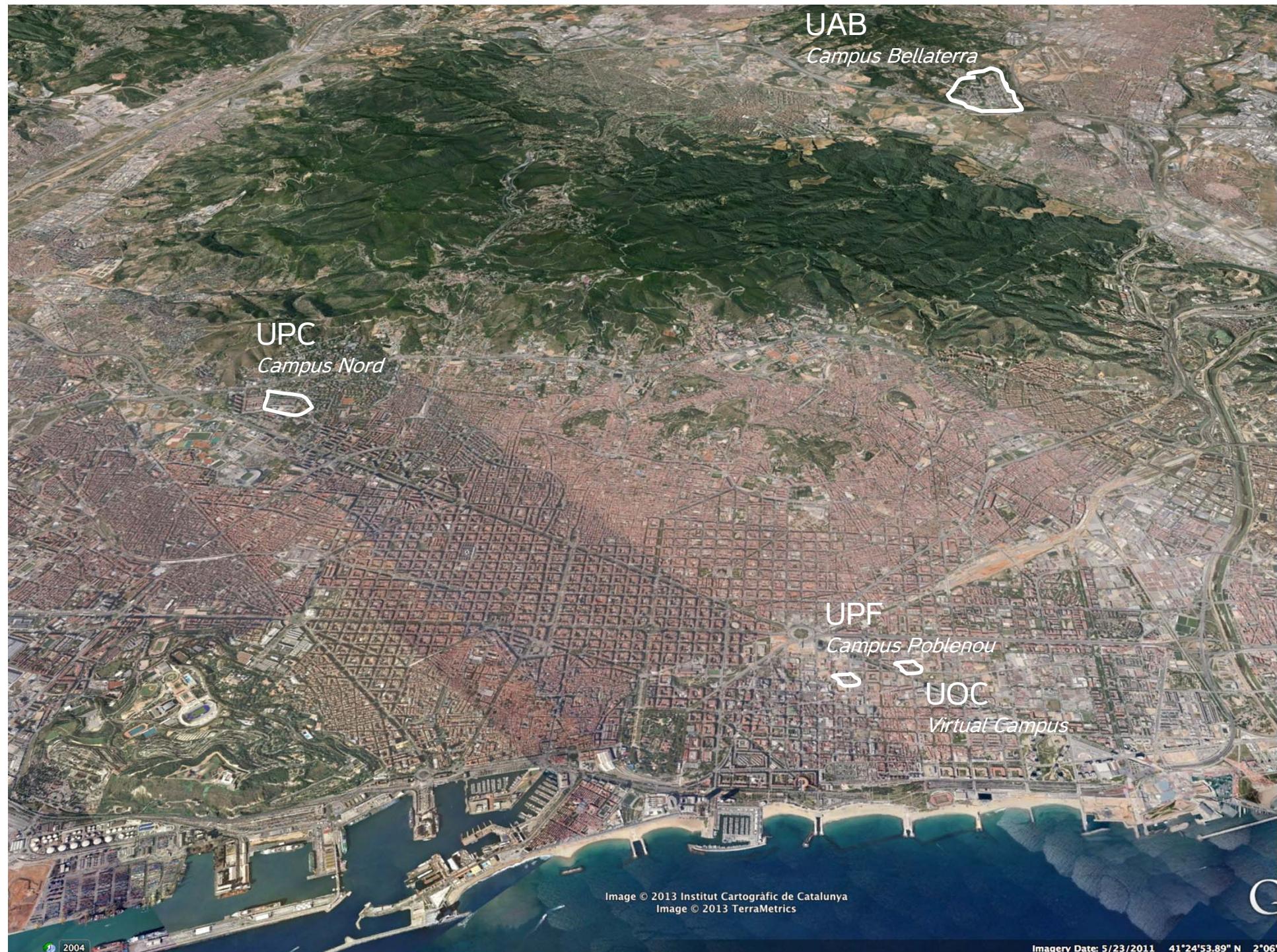
from basic techniques to state-of-art algorithms

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

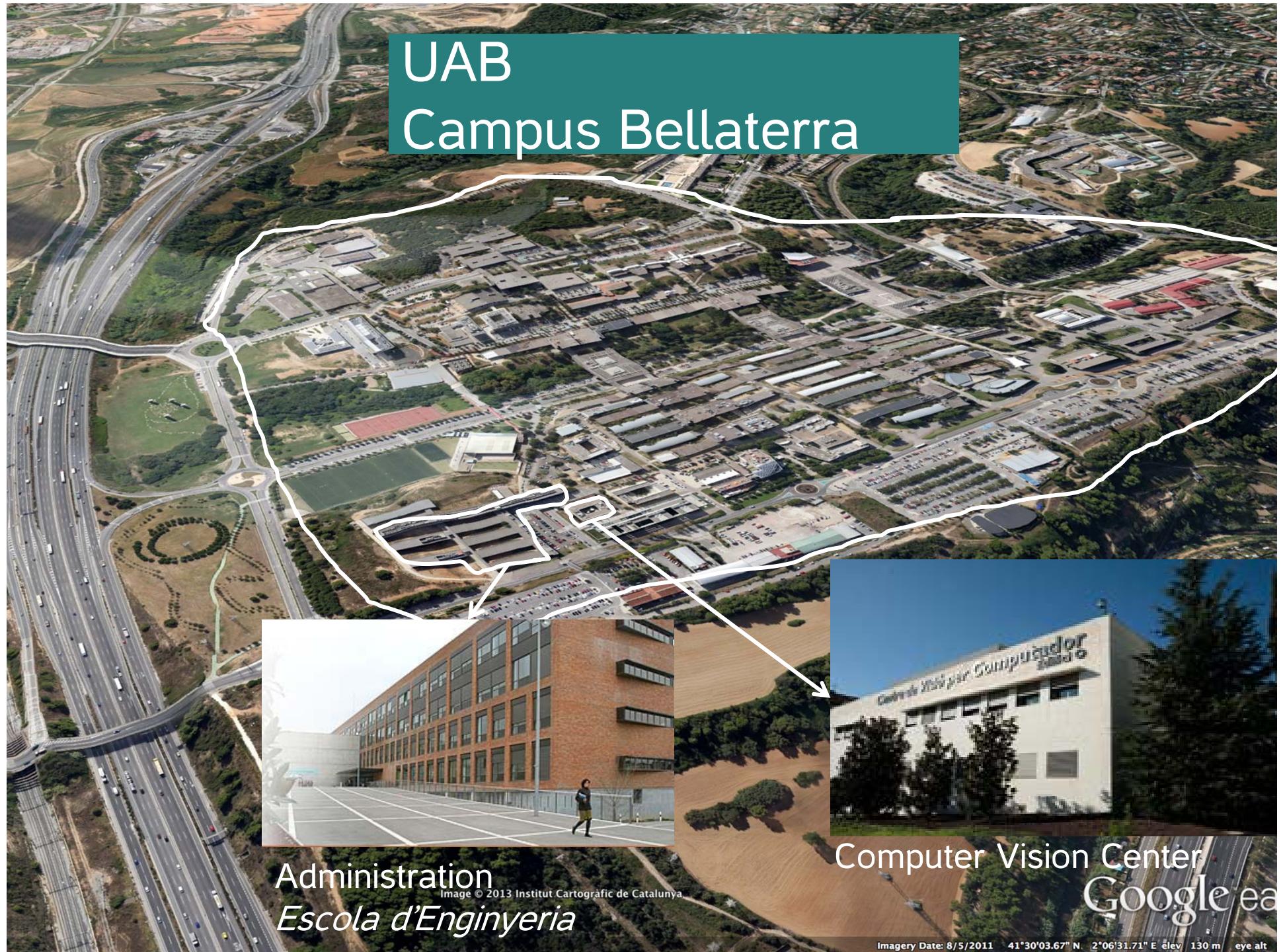
new jobs, start-up opportunities, Phd studentships

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



Google



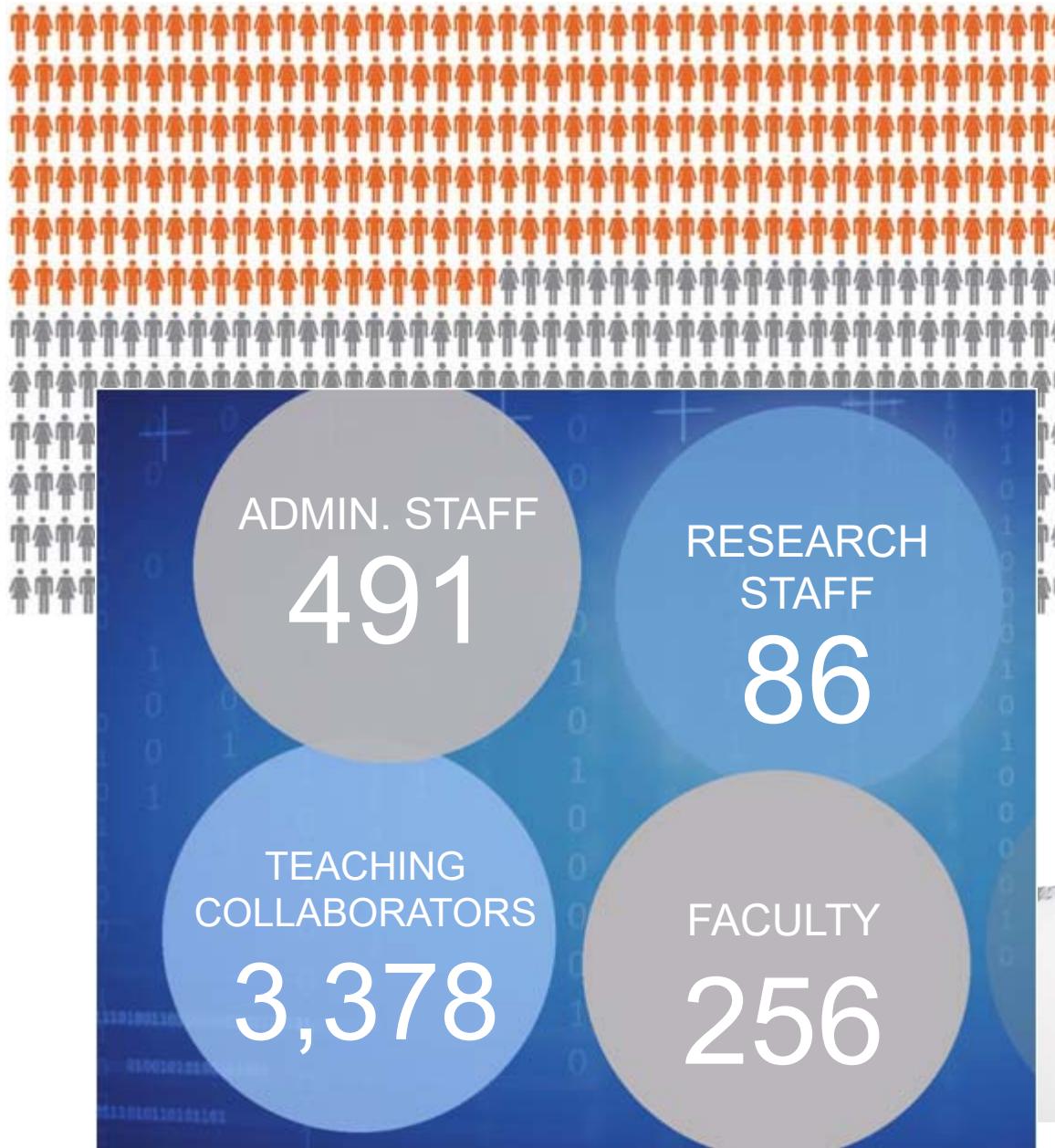
UPF
Campus Poblenou





Google

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)

5 h. on-site (20% approx.)
20 h. homework (80% approx.)

On-lines modules (M7, M8)

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



Master in Computer Vision Barcelona

Modules		ECTS	Univ.	
M1	Introduction to human and CV	6	UPC	Basic Techniques <i>(Hybrid: online-inperson)</i> 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 <i>(Hybrid: online-inperson)</i> Project-based
M5	Visual Recognition	6	UAB	
M6	Video Analysis	6	UPF	

Modules		ECTS	Univ.	
M7	Introduction to Research Dissemination	6	UOC	Transversal skills (online)
M8	Research and Technology Transfer Management	6	UOC	

Modules		ECTS	Univ.	
M9	Master Dissertation	12	ALL	Final Project <i>(under supervision)</i> Academic or at a Company

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M1	Introduction to human and CV	6	UPC	Basic Techniques <i>(Hybrid: online-inperson)</i> Project-based
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M3	Machine Learning techniques for CV	6	UAB	
M4	3D Vision	6	UPC	Vision Problems <i>(Hybrid: online-inperson)</i> Project-based
M5	Visual Recognition	6	UAB	
M6	Video Analysis	6	UPF	
M7	Introduction to Research Dissemination	6	UOC	Transversal skills <i>(online)</i>
M8	Research and Technology Transfer Management	6	UOC	
M9	Master Dissertation	12	ALL	Final Project <i>(under supervision)</i> 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

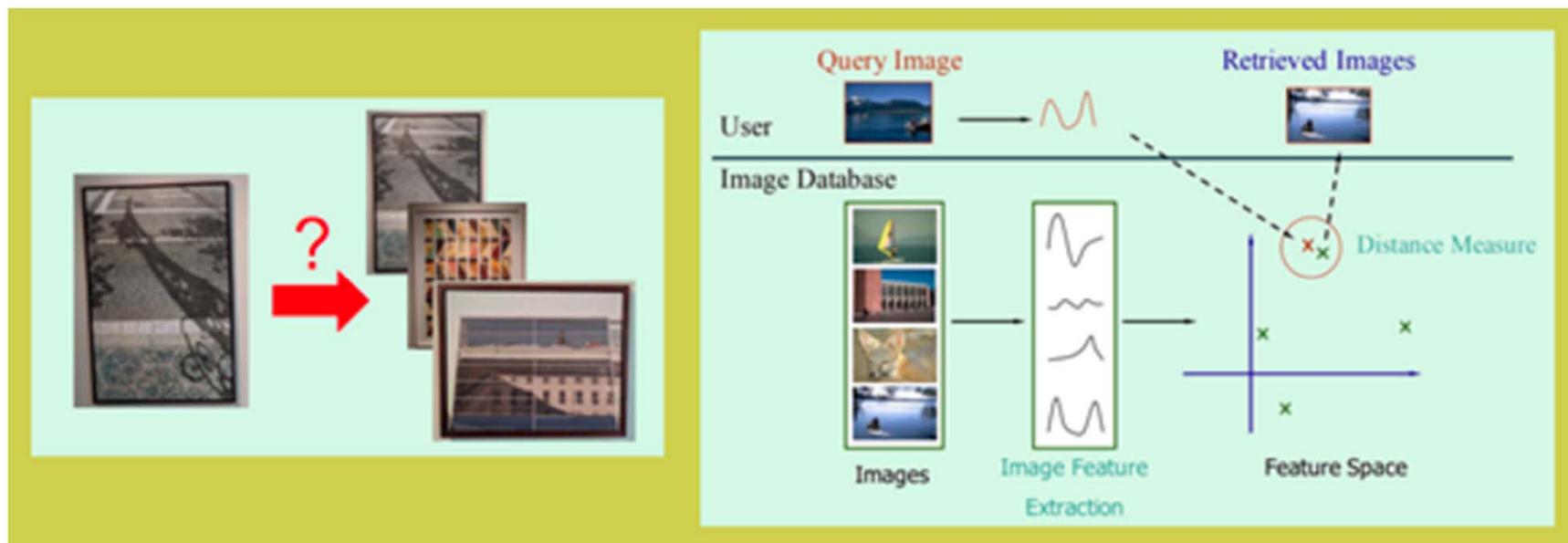
Module 5. Visual Recognition

Joan Serrat

Module 6. Video Analysis

Xavier Giró

Project 1. Museum Painting Retrieval



Project 2. Removing Objects in Natural and Urban Scenes

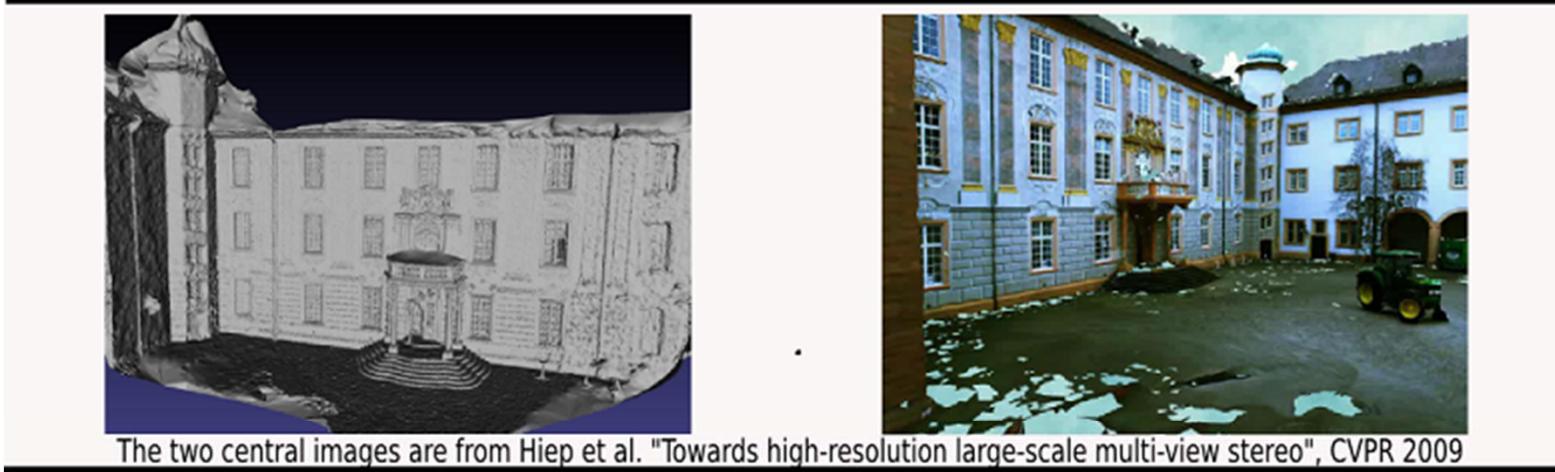


Picture from: Komodakis and Tziritas, IEEE Trans Image Proc, 2007

Project 3. Image Classification



Project 4. 3D recovery of urban scenes



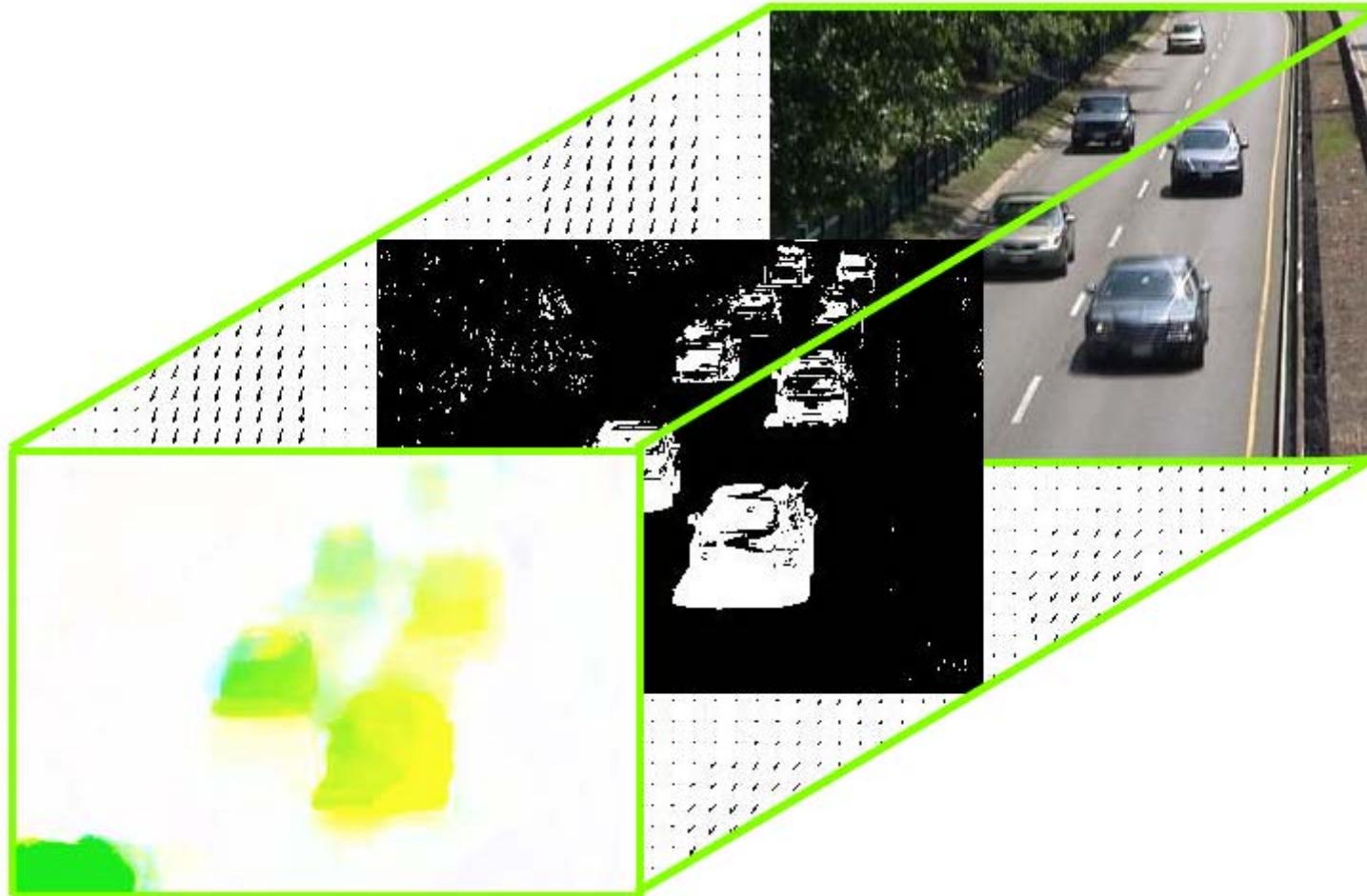
The two central images are from Hiep et al. "Towards high-resolution large-scale multi-view stereo", CVPR 2009



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:

$$\text{Final Mark} = 0,4 \times \text{Exam} + 0,55 \times \text{Project} + 0,05 \times \text{Attendance}$$

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 or 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:

- Entrepreneurship (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



Master in Computer Vision *Barcelona*

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



upf.



Master in Computer Vision *Barcelona*

Schedule, News and Shared data:

pagines.uab.cat/mcv

The screenshot shows the homepage of the Master in Computer Vision Barcelona website. The header features the logo and name of the master's program, along with logos of partner universities: UAB, UOC, UPC, and UPF. A photograph of Park Güell in Barcelona is visible in the background. The navigation bar includes links for News, Goals of the Master, Program, Schedule, Admission, Grants, Open positions, Contact, and Login.

News

— Master (*Intake October 2019*) starts on **September 27th** with a **Welcome Session** that will take place at CVC at 4pm

Courses start on **September 30th**, they take place at different Campuses within the Barcelona area depending on module coordination:

- M1 and M6 (UPC) at [Campus Nord](#)
- M2 and M4 (UPF) at [Campus Poblenou](#)
- M3 and M5 (UAB) at [Campus Bellaterra](#)
- M7 and M8 (UOC) online through the [Virtual Campus of UOC](#)

— Student Projects in companies, if your company is interested in offering internship projects for our students you can insert your proposal [\[here\]](#).

— Important!!!! This Master has been awarded with 1 Grant of Catalunya-La Pedrera Foundation - deadline for applications is July, 16th 2019 [[more information](#)]

— A new pre-registration period for this Master (2019 October Intake) will open from July 1th o **September 6th**, 2019 (issuing the resolution on September 13th). Resolution for the first pre-registration was issued on past May 31st.

— The Pre-registration period for the **Master in Computer Vision (2019 October Intake)** is from **January 11th to May 10th, 2019** (issuing the resolution on May 31st, 2019). Students interested in enrolling the master who have not yet finished their degree, must also go through this pre-registration period and if finally admitted, they will then receive an admission conditioned to them passing the degree in due time. Another pre-registration period could be open further on if vacancies, will open **from July 1st to**

Modules

M1. IHCV
M2. OICV
M3. MLCV
M4. 3DV
M5. VR
M6. VA
M7. RD
M8. RTTM
M9. MD

Practical Information
about the
modules:

Agenda, schedule,
rooms

Module Information

The screenshot shows the homepage of the Master in Computer Vision Barcelona website. It features the logo of the four partner universities (UAB, UOC, UPC, and UPF) and a photo of the Sagrada Família. The main menu includes News, Goals of the Master, Program, Schedule, Admission, Grants, Open positions, Contact, and Login. Below the menu, a section titled "M1. Introduction to human and computer vision" is displayed. This section includes a brief description of the module's aims and objectives, mentioning basics of human visual system and image perception, acquisition and processing, and various processing techniques. It also describes a project titled "Museum Painting Retrieval" which involves applying basic concepts to build a content-based image retrieval system. A diagram illustrates the process of extracting image features from a query image and comparing them with a database of images to find similar ones.

Module Schedule

Building and Room

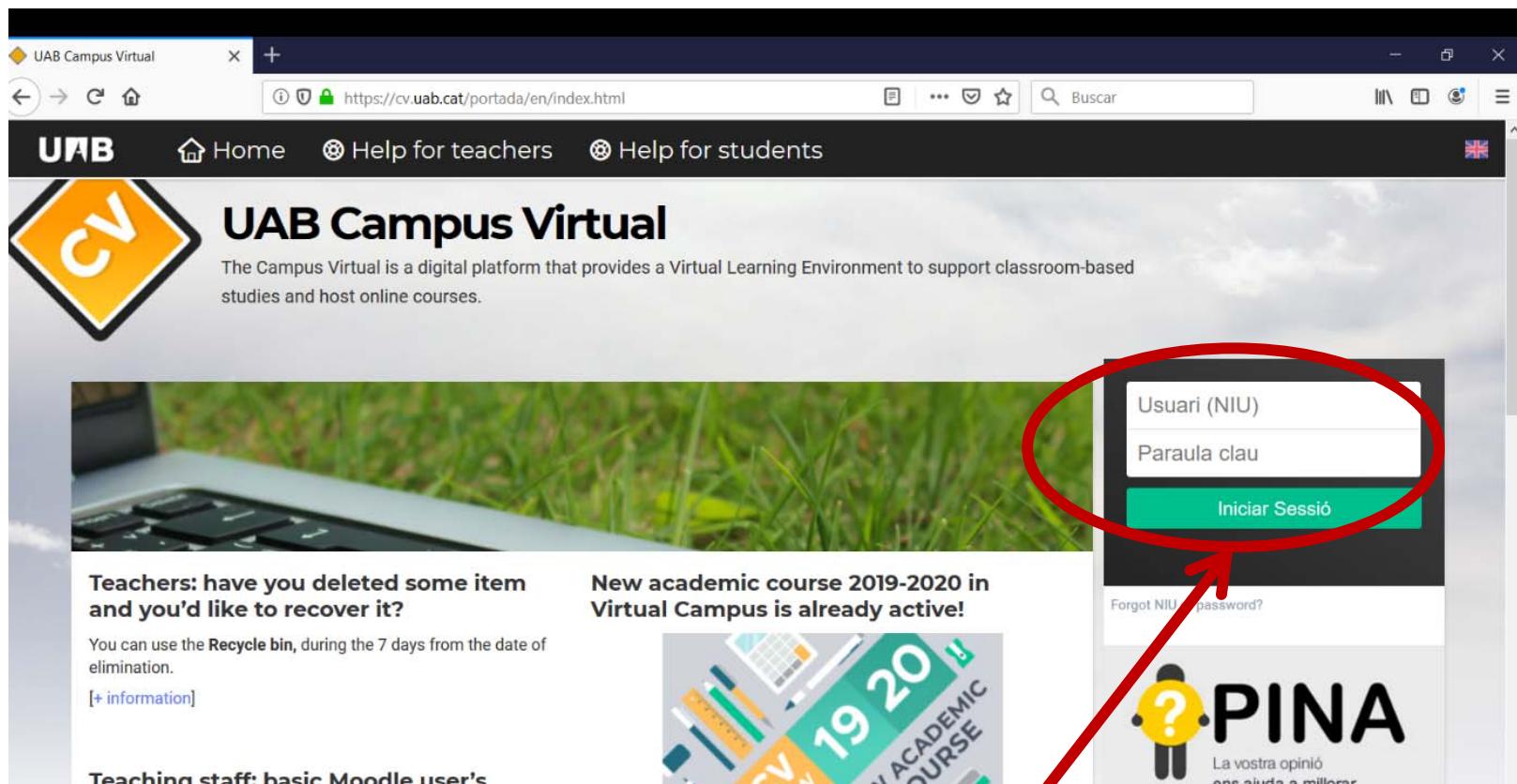
Module lectures:

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-jv
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-jv
3	Mon.Oct.18th	16h-18h	HOMEWORK		
3	Mon.Oct.18th	16h-18h	HOMEWORK		
3	Wed.Oct.20th	16h-18h	Space-frequency representation, Fourier transform and linear filtering (I)	Javier Ruiz	https://meet.google.com/xiv-rxcp-jv
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	16h-18h	Space-frequency representation, Fourier	Javier Ruiz	https://meet.google.com/xiv-rxcp-jv

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

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

IMPORTANT

Moodle Rooms for M1, M2, ... M6 and M9

The screenshot shows the Campus Virtual de la UAB Moodle interface. A red box highlights the course card for "M1. Introduction to Human and Computer Vision MO22047 (18-19)". The card displays course details: Esdeveniments propers (0 nous), Material i activitats (0 nous), and Avisos i notícies (0 nous). Below the card is a link to "Bibliografia M1. Introduction to Human and Computer Vision (43085)". To the right, a sidebar titled "ACCÉS DIRECTE" lists various links: Tauler, Gestió t, Curs ac, Curs ac, Correu, Enquest, Calendà, Catàleg, Serveis, Serveis, Propietat, and Treballs. Another red box highlights the course card for "M2. Optimisation and Inference for Computer Vision MO22048 (18-19)". This card also shows zero notifications and a link to "Bibliografia M2. Optimisation and Inference for Computer Vision (43086)". On the far right, a large box contains course navigation links: News and Forum, CONTACTS, Coordinators and Lecturers, LECTURES, Materials, PROJECT, and EVALUATION.

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!!!

The screenshot shows a web browser window with two tabs open. The top tab is titled "Virtual Campus" and contains a login form with fields for "User" and "Password" and a "Enter" button. The bottom tab is titled "www.uoc.edu/portal/ca/index.html" and displays the UOC homepage. The UOC logo is visible on the left, and a navigation bar at the top includes links for "UOC", "UOC R&I", "UOC X", "UOC Corporate", "UOC Alumni", and "UOC". A red arrow points from the "UOC" link in the navigation bar down to the "UOC" logo on the homepage. Another red arrow points from the "User" field in the login form up to the "Campus" link on the right side of the homepage header, which is circled in red.

Important: M7 course starts on October 20th

UOC Moodle rooms for M7 and M8

The screenshot shows a web browser window for the UOC Moodle platform. The URL is cv.uoc.edu/cgi-bin/uocapp?s=9d72248938b68b56c8e8b489a55a61687232373017457e023544df0b1fc1e137ae25ecaf8f52af99311.... The page title is "Campus 5.0 - UOC". The header includes the UOC logo, "Universitat Oberta de Catalunya", user information for "David Masip Rodo", and various site links like Accessibility, Settings, Help service, Mailbox, Agenda, My profile, Work groups, and Search.

The main content area shows a navigation bar with icons for My UOC, Community, Classrooms (selected), Tutor Support, Counsellors, Library, Secretary's Office, Intrauoc, and News. Below this is a dropdown menu for "M0.200 Introduction to Research Dissemination" which lists "Introduction to Research Dissemination aula 1 – Fernando Vilariño Freire,Claudia Bullion".

A sidebar on the left lists "Students Room" and years from 20091 to 20122. The main content area displays the course title "M0.200 Introduction to Research Dissemination aula 1" and a "LEARNING GUIDE" button.

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:



university of
groningen

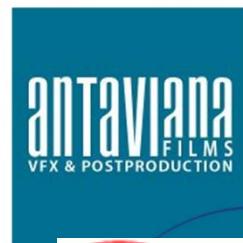
Imperial College
London

catchoom.®

PAL
ROBOTICS

visualtagging

technicolor



Welcome session

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