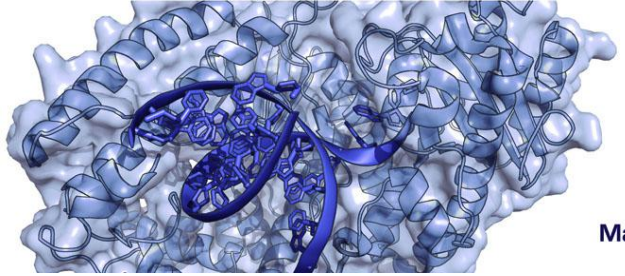
Universitat de Girona
Institut de Química Computacional i Catàlisi



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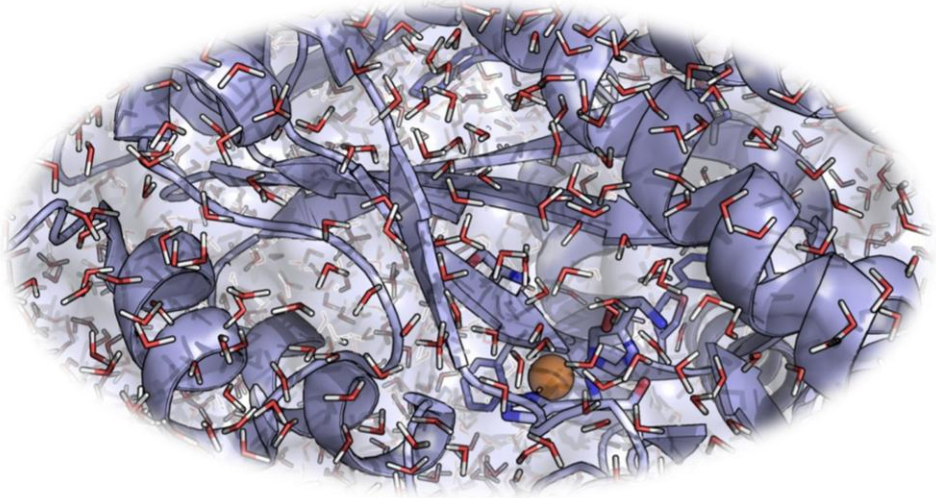
Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

Master in Advanced Catalysis and Molecular Modelling



master.macmom@udg.edu

iqcc.udg.edu/macmom

@MACMoMUdG

www.facebook.com/MACMoMUdG

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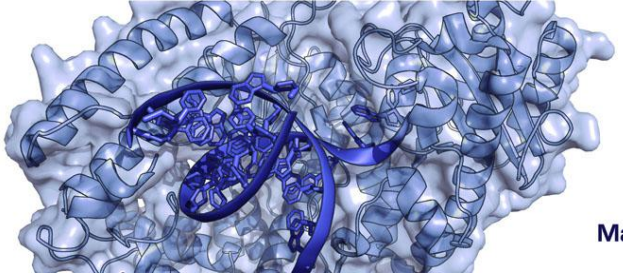

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

General Information for the academic year 2016-17

Name	MSc in Advanced Catalysis and Molecular Modelling
Field	Graduate program of Chemistry
Type	Mixed (professional and research)
Organizing unit	Institute of Computational Chemistry and Catalysis
Academic management	Faculty of Sciences, University of Girona
Workload	60 ECTS
Schedule	Full academic year. Morning and/or afternoon
Working-Time regimes	Full time. Classes from Oct-Feb
Language	English (100%)
Special requirements	English knowledge equivalent to B2 level of the Common European Framework of Reference of Languages. B2.1 level achieved after completion of BSc is also accepted.

Contact

Dr. Pedro Salvador (coordinator) Dr. Xavi Ribas Dr. Anna Pla

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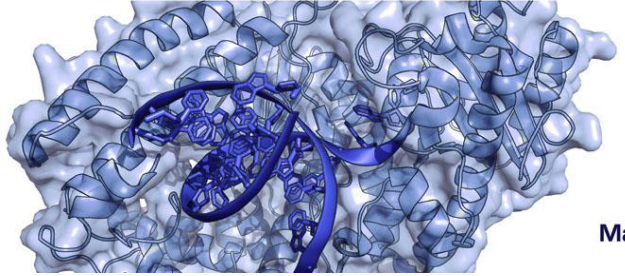
Computacional i Catàlisi



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Universitat de Girona
MACMoM
Master in Advanced Catalysis and Molecular Modelling

Formative Milestones

- To provide students with a thorough **understanding of catalytic chemistry** applied both in research and industry (where over 85% of processes involve catalysts)

- To provide students with the skills needed to address the **design** of synthesis of products integrating the most **innovative synthetic routes** and taking specially in consideration the sustainability and the efficiency of the processes.

- To provide students with **experimental** and **modelling** tools to tackle chemical problems.

- To improve the **use of English skills** to prepare the students to work worldwide.

Classes sponsored by:

BRUKER

Agilent Technologies

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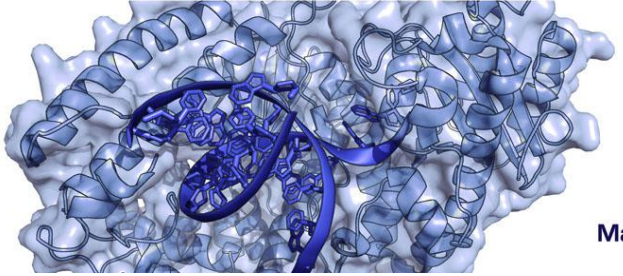

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

Curriculum for academic year 2016-17

Academic Schedule 15-16

Module name	ECTS	Semester
A1. Fundamentals		
A1.1 Fundamentals of Catalysis	12	First
A1.2 Fundamentals of Computational Chemistry		
A2. Integrated Theoretical-Experimental Laboratories		
A2.1 Structural and Spectroscopic Characterization	12	First and Second
A2.2 Reaction Mechanisms		
A3. Scientific Communication and Technology Transfer	6	First and Second
A4. Challenges in Modern Organic Synthesis	6	First
B1.1 Sustainable Catalysis	4	Second
B1.2 Catalysis for Energy Production	4	Second
B2. Advanced Experimental Techniques	4	Second
B3. Computational Techniques and Programming	4	Second
B4. Design and Simulation of Bioactive Molecules	4	Second
B5. Excited States and Photochemistry	4	Second
B6. New Tools for Chemical Bonding Analysis	4	Second
B7. External Practices in Industry	12	Second
C. Master Final Project	12	Second

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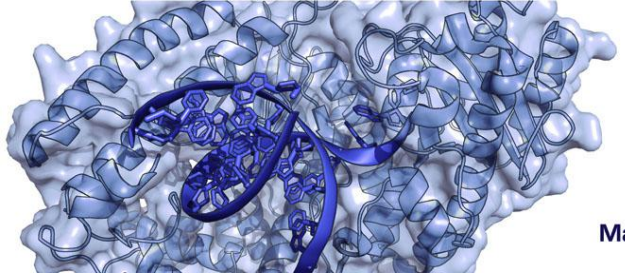

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

MANDATORY (36)

Module name	ECTS	Semester
A1. Fundamentals A1.1 Fundamentals of Catalysis A1.2 Fundamentals of Computational Chemistry	12	First
A2. Integrated Theoretical-Experimental Laboratories A2.1 Structural and Spectroscopic Characterization A2.2 Reaction Mechanisms	12	First and Second
A3. Scientific Communication and Technology Transfer	6	First and Second
A4. Challenges in Modern Organic Synthesis	6	First

Fundamentals

- ✓ Catalysts (A1.1 - 6 ECTS)
- ✓ Reactions and synthesis planning (A4 - 6 ECTS)
- ✓ Modelling (A1.2 - 6 ECTS)

Integrated labs

- ✓ Characterize products (A2.1 - 6 ECTS)
- ✓ Unravel mechanism (A2.2 - 6 ECTS)

Communication and transfer

- ✓ A3 - 6 ECTS

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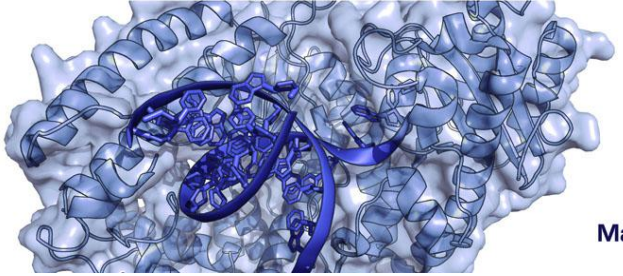

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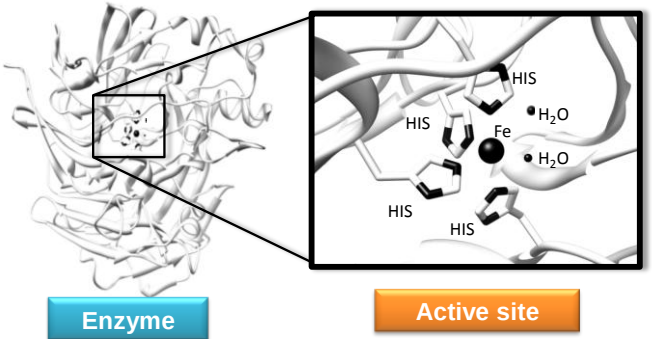
Universitat de Girona

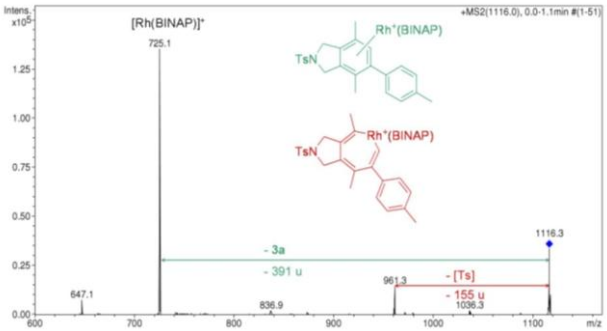
MACMoM
Master in Advanced Catalysis and Molecular Modelling

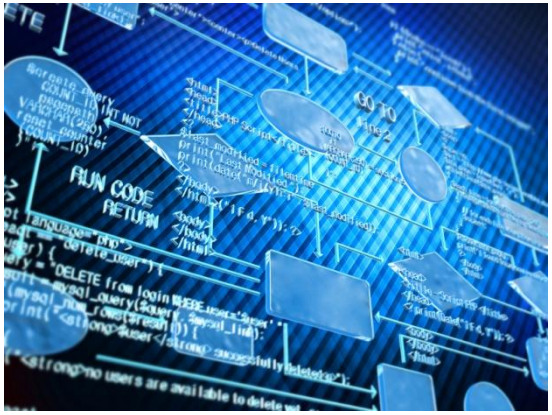
Curriculum for academic year 2016-17

OPTIONAL (12)

Module name	ECTS	Semester
B1. New Concepts in Catalysis		
B1.1 Sustainable Catalysis	4	Second
B1.2 Catalysis for Energy Production	4	Second
B2. Advanced Experimental Techniques	4	Second
B3. Computational Techniques and Programming	4	Second
B4. Design and Simulation of Bioactive Molecules	4	Second
B5. Excited States and Photochemistry	4	Second
B6. New Tools for Chemical Bonding Analysis	4	Second
B7. External Practices in Industry	12	Second







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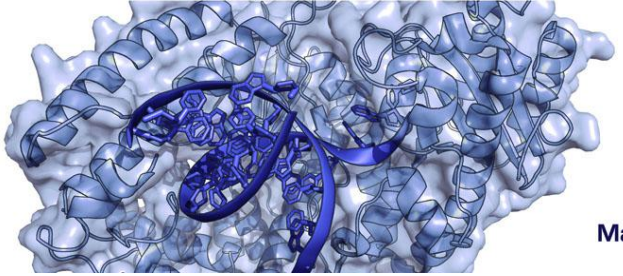

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Universitat de Girona
MACMoM
Master in Advanced Catalysis and Molecular Modelling

Professional pathway: Internship in companies

- Includes optative module B7 + Master Final Project
- **Starting from February 2017.**
- Current offers by companies in Girona-Barcelona area but also International

Timespan	Second Semester (**up to 750 hours**)
Tutoring	Co-tutored
Work plan	Proposed by the company Available projects will be announced every year
How to apply	Pre-registration needed. The company will select candidates before registration period is closed.
I'm interested	Contact Master's Coordinator

Check out for the current projects and the regulation for internships

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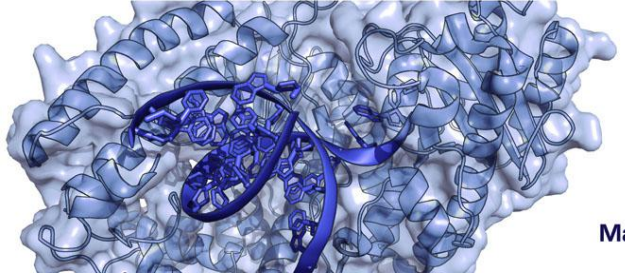

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Universitat de Girona
MACMoM
Master in Advanced Catalysis and Molecular Modelling

Research pathway

Master's Thesis

•Tutored by a research staff member of the IQCC or the Department of Chemistry.

•Carried out in the research labs of the Science Faculty or the Science and Technology Parc, from March to July (also possible in other Research centers abroad).

•M.Sc thesis defence in July or September.

•Report : Max 50 pages, 20 min oral presentation. English

Check out for the active research lines of the IQCC and our latest research results at the Institute Blog

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Institut de Química
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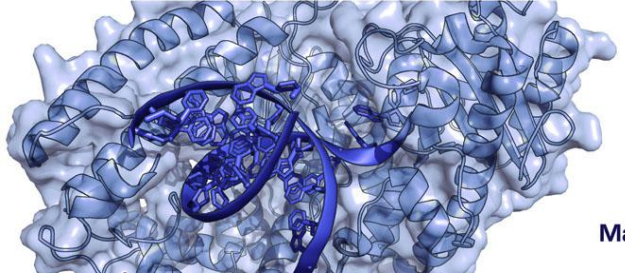

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

Scholarships and Funding

- The Banc de Santander-UdG program
- Regular scholarships from the Spanish Ministry of Education
- The IQCC scholarship program
- Personal research contract with a research group
- Scholarship from Generalitat de Catalunya (Grant program AAD)

Check out our research group's website for additional funding possibilities for M.Sc. and Ph. D. studies

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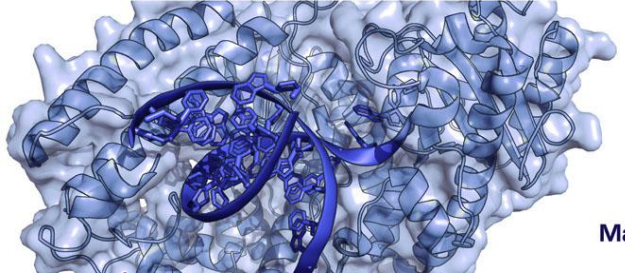

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Banco Santander-UdG program

Convocatoria abierta:
http://www.udg.edu/tabid/21393/Default.aspx

Modalidad A

- Hasta 3000€ para cubrir gastos de matricula
- 55 Becas en toda la UDG
- Incompatible con beca de régimen general del Ministerio
- Mínimo 2 becas para el MACMoM (obtenidas 6 para el curso 2015-16)
- **Fecha límite para solicitud 27 Junio 2016**
- **Hay que estar preinscrito para pedirla!!**

Ya está abierta la preinscripción! Toda la información se encuentra en la URL www.udg.edu/masters

http://aserv.udg.edu/preinscripcions/wizard.aspx

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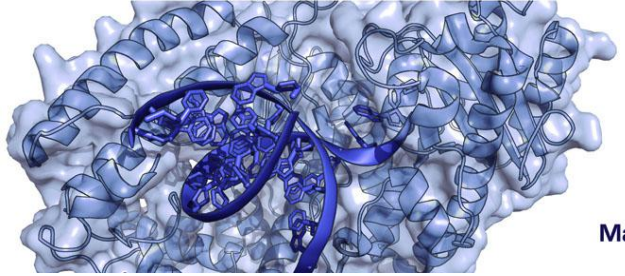

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

The IQCC scholarship program

- Becas para hacer investigación en algún grupo adscrito al Instituto de Química Computacional y Catálisis
- Cubren el periodo para hacer el Trabajo de Fin de Master (Marzo-Julio)
- Aprox. 5 meses, alrededor de 400€/mes
- Numero de becas todavía para determinar (consultar Septiembre 2016)

Personal research contract with a research group

- Becas para hacer investigación con algún investigador adscrito al Instituto de Quimica Computacional y Catálisis
- Dependen de la disponibilidad presupuestaria de cada investigador.
- Las asigna el investigador que la saca a concurso
- En principio igualmente 400€/mes, aunque es el investigador quien elige.

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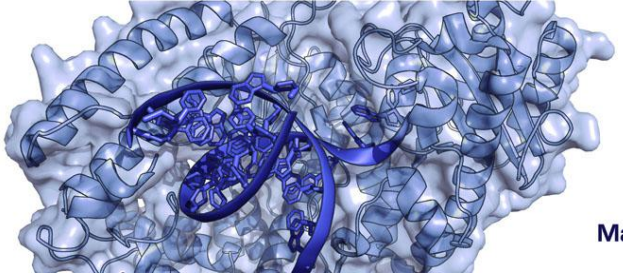

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Universitat de Girona
MACMoM
Master in Advanced Catalysis and Molecular Modelling

Convenios de Doble Titulación

- **Universidad de Guanajuato (Mexico)***
- **Universidad Particular Técnica de Loja (Ecuador)**
- **Pontificia Universidad Catolica del Perú (Lima, Perú)**

Titulaciones de 2 años

Cursando el MACMoM solo requiere un año adicional

Bidireccional

*Pública (sin coste de matricula)

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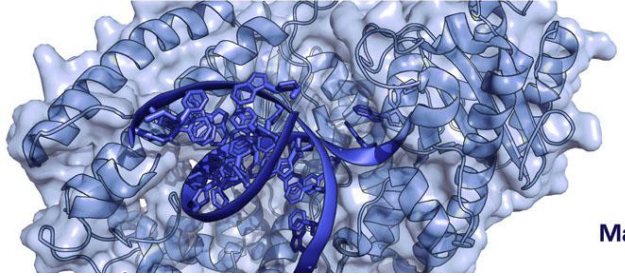

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MACMoM
Master in Advanced Catalysis and Molecular Modelling

I'm interested...what to do?

1. **Contact with the Master's coordinator (master.macmom@udg.edu)**

3a convocatòria

- Període de preinscripció: Del 16 de maig al 13 de juliol de 2016
- Resolució d'admissió: Fins al 19 de juliol de 2016
- Període de matrícula: A partir del 20 de juliol 2016, a determinar pel calendari acadèmic i administratiu per al curs 2016-2017

Durant l'agost només serà possible la matriculació online. Degut al tancament d'edificis NO hi haurà suport administratiu en aquest període.

4a convocatòria

- Període de preinscripció: Del 16 de juliol al 18 de setembre de 2016
- Resolució d'admissió: Fins al 23 de setembre de 2016
- Període de matrícula: A partir del 24 de setembre de 2016, a determinar pel calendari acadèmic i administratiu per al curs 2016-17

Convocatòria extraordinària

S'establirà un primer termini de matrícula extraordinària en cas que quedin places vacants. Una vegada resolta la quarta convocatòria d'assignació i matrícula, serà possible la matrícula fins a 15 dies després de l'inici de les activitats acadèmiques marcat pel calendari del curs 2016-17. En conseqüència, aquests estudiants, perden el dret a l'anul·lació de matrícula si no entren dins del termini establert en aquest calendari.

S'establirà un segon termini de matrícula extraordinària, a determinar pel calendari acadèmic i administratiu per al curs 2016-17, per a estudiants de nou accés que, havent obtingut plaça, no hagin pogut matricular-se en els períodes establerts. La matrícula, en aquest període, s'ha de referir necessàriament a assignatures de 2n semestre.

Nota: Es recomana als candidats de fora de la UE que facin la preinscripció abans de la 3a convocatòria.

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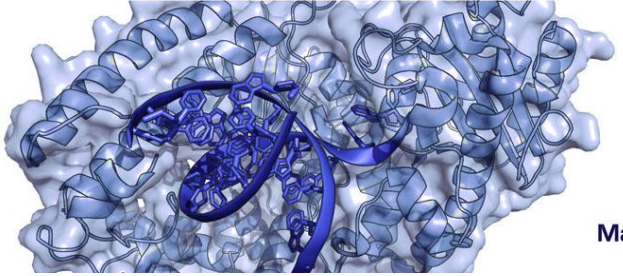

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Master in Advanced Catalysis and Molecular Modelling

Our resources at the Science and Technology Parc

N_2 Glove-boxes / Solvent Purification

N_2-Vaccum lines / Flash Chromatography System

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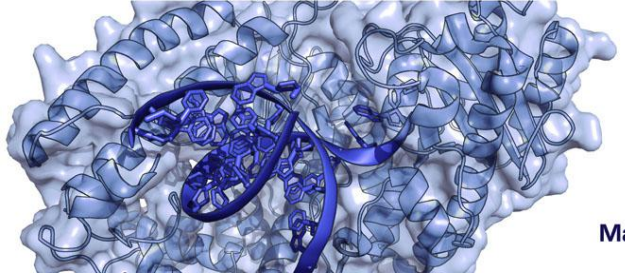

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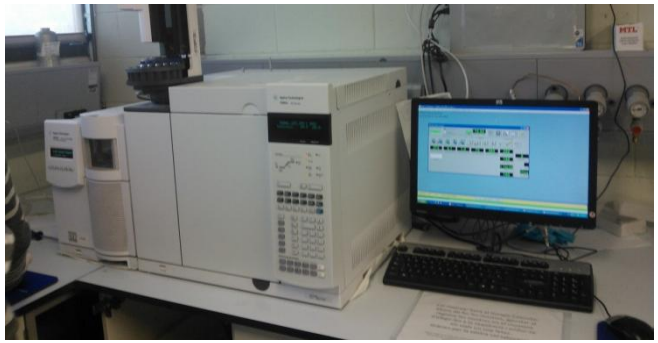
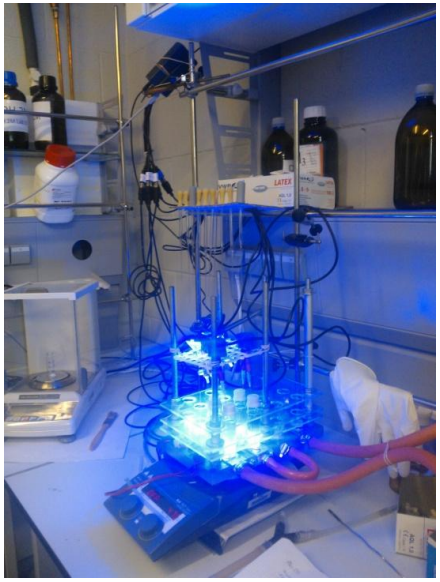
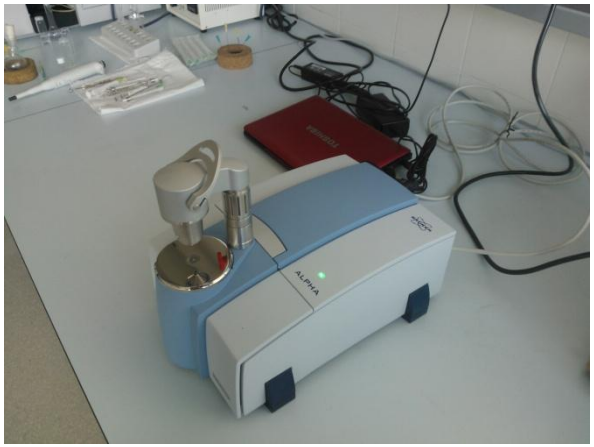


GC-MS

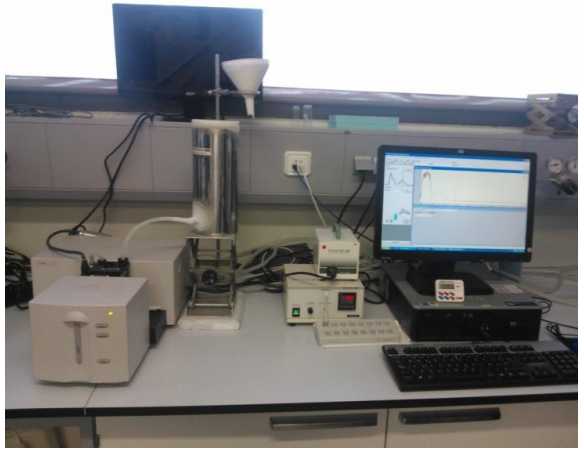


Photochemical reactor LED / Gas Evolution-Consumption

High resolution MS-TOF / Cryospray (-100 ºC to +100 ºC)



ATR-InfraRed



UV-Vis / Cryostat (-100 to +100 ºC)

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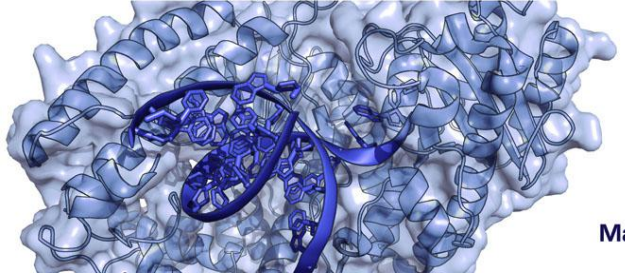

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Universitat de Girona
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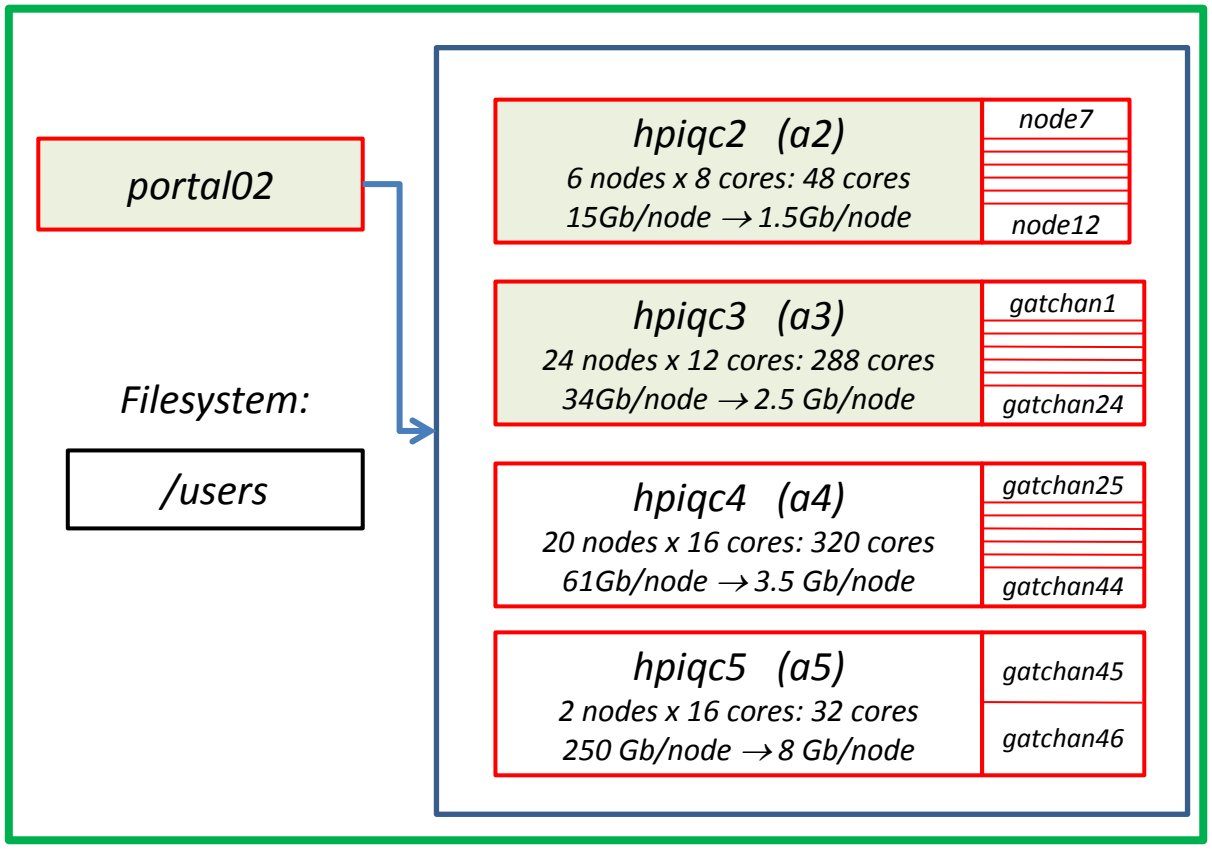
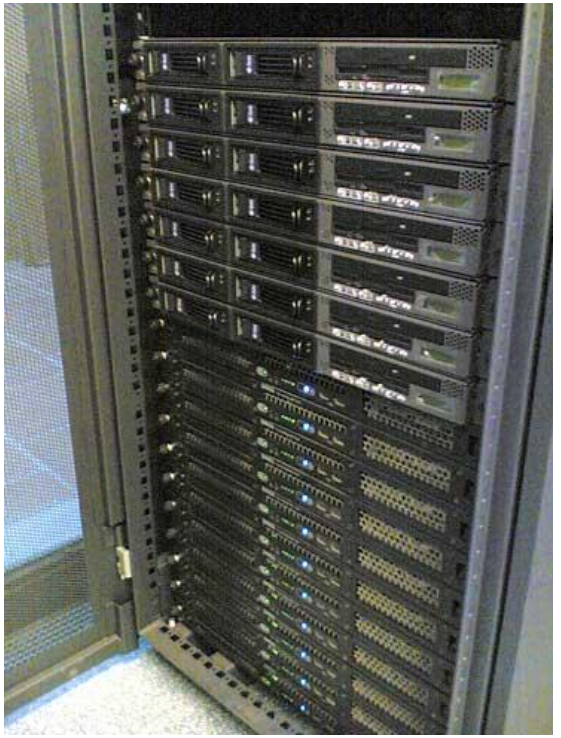
Master in Advanced Catalysis and Molecular Modelling

Our resources at the Science and Technology Parc

Four generations (fifth is on his way) of PC clusters for scientific supercomputing

beta.udg.edu





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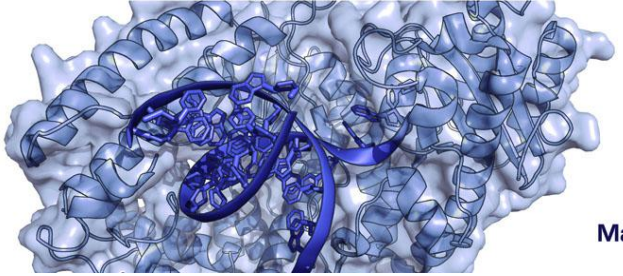

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Universitat de Girona

MACMoM
Master in Advanced Catalysis and Molecular Modelling

Our resources at the Faculty of Sciences

Lyophiliser

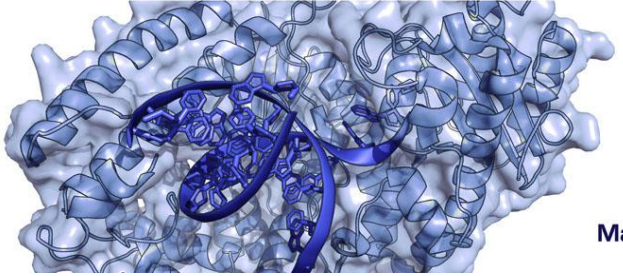
Peptide synthesizer

HPLCs

Solvent Purification

Microwave

Universitat de Girona
Institut de Química Computacional i Catàlisi



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Other resources we have access to (STR UdG)

NMR 400 MHz, 300 MHz
(-80 ºC / +100 ºC)

X-Ray Diffractometer
(-150ºC / +25 ºC)

Elemental Analyser
(C, H, N, S)

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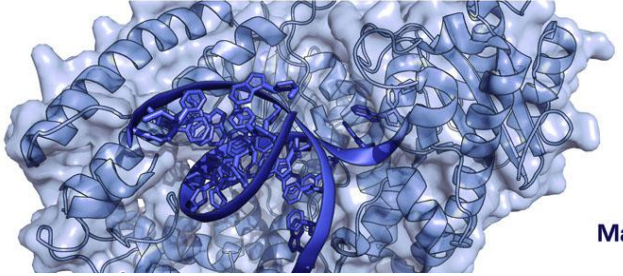

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Other resources we have access to

BSC **Barcelona Supercomputing Center**
Centro Nacional de Supercomputación

After the last upgrade on December 2012, MareNostrum has 48,448 Intel Sandy Bridge processors in 3,028 nodes, with more than 94 TB of main memory and 1.9 PB of disk storage.

Currently, MareNostrum holds the 36th position in the TOP500 list of fastest supercomputers in the world.

MARENOSTRUM