DEPARTAMENT DE QUÍMICA ORGÀNICA

NÚMERO	TEMA	TUTOR(S) ACADÈMIC(S) (si un és d'un altre departament, posa'l entre parèntesi)	TUTOR EXTERN (si escau)
1	Synthesis of Bispyridines and Their Study in Desymmetrization Reactions	Carlos Vila Descals	
2	Synthesis of New Bifunctional Organocatalysts Derived from Cinchona Alkaloids and Their Application in Desymmetrization Reactions	Carlos Vila Descals	
3	Revisiting Organic Chemistry Laboratory II Practices from the Perspective of Green Chemistry and Sustainability	Salah Eddine Stiriba Lakani	
4	Development of intramolecular enantioselective Minisci reaction driven by visible-light irradiation	María Jesús Cabrera Afonso / Marcos Escolano Pérez	
5	Nanoformulation of Organic Dyes for Photocatalytic Applications	María González Béjar / Soranyel González Carrero	
6	Enantioselective desymmetrization reactions for the synthesis of axially chiral biaryls	Jaume Rostoll Berenguer	
7	De novo synthesis of highly substituted anilines	Carlos del Pozo Losada / María Sánchez Roselló	
8	Enantioselective synthesis of chiral aziridines from sulfonyl fluorides	Gonzalo Blay Llinares	
9	Radical Strategies for the Synthesis of Sulfonyl Fluorides	Marc Montesinos Magraner	
10	Synthesis and characterization of polyamine compounds containing pyrazole units for the recognition of anions of environmental interest	M. Paz Clares García	
11	Modification of optical fibers for optoacoustic applications	Salvador Gil Grau	
12	Design, synthesis and evaluation of sensors for the detection of chemical submission drugs	Salvador Gil Grau	
13	Electrochemical Organocatalytic Strategies for Alkene Difunctionalization	Amparo Sanz Marco	
14	Drug detection using nanomaterials	Jose Antonio Sáez Cases	
15	Smart mesoporous nanocarriers activated by hypoxic enzymes for cancer therapy	María Carmen Coll Merino	
16	Design and Development of Stimuli-Responsive Mesoporous Nanomaterials for Controlled Drug Delivery	Pau Arroyo Máñez	
17	Design, synthesis and characterization of chemosensors for optical drug detection	Pablo Gaviña Costero	
18	Enantioselective addition reactions of isocyanides	Alicia Monleón Ventura	
19	The utilization of enzymes in asymmetric catalysis	Alicia Monleón Ventura	
20	Synthesis of Polyamine Ligands and Study of Their Anionic and Cationic Interactions	M. Paz Clares García / José Miguel Llinares Berenguer	
21	Near-Infrared Photocatalytic Trifluoromethylation of Indoles	Jorge Escorihuela Fuentes / María González Béjar	
22	Near-Infrared Photocatalytic Trifluoromethylation of Alkenes	Jorge Escorihuela Fuentes	
23	Photocatalytic approach for the oxidation of boronic acids using near-infrared light	Jorge Escorihuela Fuentes	

24	Selective Electrocatalytic Carboxylation of Olefins	Marcos Gil Sepulcre / Amparo Sanz Marco	
25	Synthesis of fine-tuned ligands and catalysts for electrocatalytic reduction of unsaturated C-C bonds	Marcos Gil Sepulcre	
26	New Catalyst from Collapsed Hydrogels	Rosa Adam Ortiz / Rafael Ballesteros Garrido	
27	Synthesis of Nitrogen-Containing Heterocycles	Rosa Adam Ortiz / Rafael Ballesteros Garrido	
28	New Metal Harversters	Rosa Adam Ortiz / Rafael Ballesteros Garrido	
29	Study of catalytic methods for the obtention of azacompounds	Andrea Olmos Vergé / María del Carmen Ramírez de Arellano Sánchez	
30	Design of partially intermolecular [2+2+2]-cyclization for the acces of chromane and quinoline cores	Andrea Olmos Vergé / María del Carmen Ramírez de Arellano Sánchez	
31	Development of tandem cyclization/functionalization reactions catalyzed by 3d metals	María del Carmen Ramírez de Arellano Sánchez / Andrea Olmos Vergé	
32	Synthesis of cyanines for near-Infrared Photocatalysis	María González Béjar / Jorge Escorihuela Fuentes	
33	Synthesis of core-shell upconversion nanoparticles	María González Béjar	
34	New Materials from Biopolymers	Rafael Ballesteros Garrido / Rosa Adam Ortiz	
35	Development of Novel Materials for the Capture of Mercury and Cadmium from Aqueous Media	Rafael Ballesteros Garrido / Rosa Adam Ortiz	
36	Liposomal nanoparticles in oncological treatments	Jose Antonio Sáez Cases	
37	Surface Functionalisation of Optical Fibres for Optoacoustic Wave-Based Sensors	Pau Arroyo Máñez	
38	Integrating a Gender Perspective into Organic Chemistry Education	Santiago Díaz Oltra	
39	Molecular Dynamics in the search of novel antidepressants	Mª del Mar Ríos Gutiérrez	
40	Photoactive Nanoparticles Prepared by Miniemulsion Polymerization	María González Béjar / (Rafael Muñoz-Espí)	
41	Perovskite nanomaterials: a new platform for organic photocatalysis	Raquel E. Galian Baca	
42	Engineering sustainable nanomaterials with tunable luminescent properties	Raquel E. Galian Baca	
43	Advanced hybrid materials for optoelectronic applications	Raquel E. Galian Baca / Soranyel Gonzalez Carrero	
44	Experimental synthesis and persistent luminescence properties of doped lead-free inorganic perovskites	Raquel E. Galian Baca / (Teresa Delgado Pérez)	
45	How tyres are turning green	Ana C. Cuñat Romero	

Annex I

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR: Carlos Vila Descals

ACADEMIC TUTOR (if needed):

EXTERNAL TUTOR (if needed):

Department: Química Orgànica

TITLE (Mandatory in English)

Synthesis of Bispyridines and Their Study in Desymmetrization Reactions

OBJECTIVES / OBJECTIUS / OBJETIVOS (Choose the language)

Es ben coneguda la importància de la quiralitat de les molècules orgàniques en diferents àrees, que van des de la Biologia a la Ciència dels Materials. Així, el desenvolupament de nous mètodes de síntesis enantioselectiva constitueixen en la actualitat un àrea de intensa investigació. Entre ells, els procediments catalítics (catàlisis asimètrica) resulten especialment atractius ja que permeten minimitzar el consum de quiralitat i disminuir la producció de residus. En este context existeixen molt pocs exemples de la desimetrització de compostos orgànics amb dos anells de piridina per generar compostos quirals de manera enantioselectiva. Així en aquest projecte es planteja com objetiu l'estudi de la desimetrització de compostos amb dos anells de piridina utilitzant diferents reaccions

METHODOLOGY / METODOLOGIA / METODOLOGÍA (Choose the language)

Es seguirà una metodologia similar a la utilitzada pel nostre grup de investigació en altres reaccions enantioselectives organocatalítiques. En concret es durà a terme:
1) Síntesis de diferents substrats de partida.
2) Identificació de les condicions òptimes de reacció, en lo que fa referencia al rendiment de la reacció i, en especial, a la enantioselectivitat, utilitzant diferents organocatalizadors.
3) Estudi de l'abast i limitacions de la reacció, utilitzant diferents compostos orgánics.
4) L'anàlisi dels productes finals de cada reacció es durà a terme segons la metodologia estàndard en síntesis orgànica (mètodes cromatogràfics i espectroscòpics). L'excés enantiomèric per a cadascun dels productes obtinguts es determinarà mitjançant cromatografia líquida d'alta resolució (HPLC) i la configuració absoluta es determinarà per difracció de raigs X de monocristall.

(Department stamp)

Annex I

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR: Carlos Vila Descals

ACADEMIC TUTOR (if needed):

EXTERNAL TUTOR (if needed):

Department: Química Orgànica

TITLE (Mandatory in English)

Synthesis of New Bifunctional Organocatalysts Derived from Cinchona Alkaloids and Their Application in Desymmetrization Reactions

OBJECTIVES / OBJECTIUS / OBJETIVOS (Choose the language)

Es ben coneguda la importància de la quiralitat de les molècules orgàniques en diferents àrees, que van des de la Biologia a la Ciència dels Materials. Així, el desenvolupament de nous mètodes de síntesis enantioselectiva constitueixen en la actualitat un àrea de intensa investigació. Entre ells, els procediments catalítics (catàlisis asimètrica) resulten especialment atractius ja que permeten minimitzar el consum de quiralitat i disminuir la producció de residus. En este context ela preparació de nous organocatalitzadors es de gran interés. Així en aquest projecte es planteja com objetiu la síntesi de nous catalitzadors bifuncionals i el seu l'estudi en reaccions de desimetrització

METHODOLOGY / METODOLOGIA / METODOLOGÍA (Choose the language)

Es seguirà una metodologia similar a la utilitzada pel nostre grup de investigació en altres reaccions enantioselectives organocatalítiques. En concret es durà a terme:
1) Síntesis de diferents catalitzadors.
2) Identificació de les condicions òptimes de reacció, en lo que fa referencia al rendiment de la reacció i, en especial, a la enantioselectivitat, utilitzant diferents organocatalizadors.
3) Estudi de l'abast i limitacions de la reacció, utilitzant diferents compostos orgánics.
4) L'anàlisi dels productes finals de cada reacció es durà a terme segons la metodologia estàndard en síntesis orgànica (mètodes cromatogràfics i espectroscòpics). L'excés enantiomèric per a cadascun dels productes obtinguts es determinarà mitjançant cromatografia líquida d'alta resolució (HPLC) i la configuració absoluta es determinarà per difracció de raigs X de monocristall.

(Department stamp)

Annex 1 (not to be printed)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 SALAH EDDINE STIRIBA LAKANI

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): QUIMICA ORGANICA

TITLE (Mandatory in English)

Revisiting Organic Chemistry Laboratory II Practices from the Perspective of Green Chemistry and Sustainability

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Analysis of the Organic Chemistry Laboratory II practices used in the Department of Organic Chemistry of the Faculty of Chemistry. and evaluation of their level of sustainability based on Green Chemistry criteria and sustainability metrics, while proposing safer, more efficient, and environmentally freindly alternatives.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

1. Selection of a set of organic chemistry laboratory II experiments
2. Definition of evaluation criteria based on Green Chemistry principles and sustainability metrics.
3. Application of sustainability metrics, including atoms economy, E scale, solvent selection, waste generation, energy consumption and safety considerations to evaluate each laboratory prectice of the planned set of organic chemistry laboratory II.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María Jesús Cabrera Afonso

ACADEMIC TUTOR 2 Marcos Escolano Pérez

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Development of intramolecular enantioselective Minisci reaction driven by visible-light irradiation.

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

El objetivo principal del trabajo es desarrollar y optimizar un nueva reacción de Minisci intramolecular de forma asimétrica. Para ello se deberá:

-Diseñar y sintetizar nuevos sustratos de partida capaces de experimentar una reacción de Minisci intramolecular.

-Optimizar y comprobar el alcance de la reacción de Minisci iniciada por luz visible.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Se pretende combinar dos metodologías. Por una parte se empleará luz visible para generar radicales mediante un proceso de abstracción de hidrógeno (HAT). Y por otra, se pretende inducir la quiralidad mediante la organocatálisis asimétrica, que se basa en el empleo de pequeñas moléculas orgánicas quirales capaces de catalizar con eficacia diversos tipos de reacciones enantioselectivas.

Además durante la realización del trabajo, el alumno deberá familiarizarse con las técnicas y habilidades más comunes en el ámbito de la síntesis orgánica. Entre ellas destacan: el montaje de reacciones en condiciones inertes, la purificación y secado de disolventes y reactivos, la caracterización de compuestos orgánicos mediante RMN y la obtención de los excesos enantioméricos de los productos finales mediante HPLC de fase estacionaria quiral.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 MARIA GONZALEZ BEJAR

ACADEMIC TUTOR 2 SORANYEL GONZALEZ CARRERO

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): QUIMICA ORGANICA

TITLE (Mandatory in English)

Nanoformulation of Organic Dyes for Photocatalytic Applications

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

General Objective: To develop and characterize nanoformulations of organic dyes aimed at enhancing their efficiency and stability for photocatalytic applications.
Specific Objectives:
- To design and synthesize nano-scale formulations incorporating selected dyes.
- To characterize the physicochemical properties of the nanoformulations, including particle size, morphology, surface charge, and optical absorption.
- To evaluate the photostability of the nanoformulated dyes compared to their free (non-encapsulated) counterparts.
-To assess the photocatalytic performance of the developed systems.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Suitable organic dyes will be selected based on their optical absorption and photocatalytic potential, followed by the preparation of nanoformulations using appropriate techniques such as nanoprecipitation, emulsification, or encapsulation into polymeric or inorganic matrices.
The resulting systems will be characterized using physicochemical techniques, including dynamic light scattering (DLS) for particle size distribution, electron microscopy (SEM/TEM) for morphology, UV-Vis spectroscopy for optical properties, and zeta potential measurements for surface charge.
Photostability studies will be conducted under controlled irradiation conditions to compare nanoformulated and free dyes.
The photocatalytic activity will be evaluated through model reactions (e.g., degradation of organic pollutants) under UV or visible light, monitoring reaction kinetics and efficiency.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jaume Rostoll Berenguer

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgànica

TITLE (Mandatory in English)

Enantioselective desymmetrization reactions for the synthesis of axially chiral biaryls

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Estudi de l'aplicabilitat de la reacció de desimetrització enantioselectiva de derivats de resorcinol amb isocianats.
Els objectius són:
-Síntesi de direrents substrats de partida.
-Estudi de la influència de l'estructura del substrat en el rendiment de la reacció i en l'excés enantiomèric del producte.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Se seguirà una metodologia similar a la utilitzada pel nostre grup d'investigació. En concret es durà a terme:

-Ús de tècniques habituals en un laboratori de química orgànica (extracció líquid-líquid, CCF, filtració i purificació en columna cromatrogràfica entre d'altres).
-Ús de tècniques espectroscòpiques (RMN i IR) i espectromètriques (HRMS) per a la caracterització dels productes de reacció.
-Ús de cromatografia líquida (HPLC) amb una fase estacionària quiral per a la determinació del grau d'enantioselectivitat de la reacció.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Carlos del Pozo Losada

ACADEMIC TUTOR 2 María Sánchez Roselló

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

De novo synthesis of highly substituted anilines

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

The main objective is the development of a new synthetic methodology to access hihgly substituted anilines, compounds of high relevance in the chemical and pharmaceutical industry

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The methodology involves a tandem protocol of dicyanoalkenes and conjugated sulfinyl imines. The optimization of the process and the initial evaluation of the scope will be developed in the degree final project.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 GONZALO BLAY LLINARES

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): QUÍMICA ORGÀNICA

TITLE (Mandatory in English)

Enantioselective synthesis of chiral aziridines from sulfonyl fluorides

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Development of a synthetic procedure for the stereoselective preparation of aziridines from imines and phenylmethylsulfonyl fluoride

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Chiral N-sulfenyl imines will be prepared from aldehydes and chiral tert-butyl sulfenylamine. These will be treated with phenylmethylsulfonyl fluoride, what should lead to aziridines after nucleophilic addition and elimination of SO2. The reaction conditions will be optimized to achieve the highest possible yields and stereoselectivity. A preliminary study of the scope of the reaction will be performed.
The student should acquire skills in the following aspects:
Bibliographic search.
Advanced organic chemistry laboratory techniques (reactions under inert atmosphere, handling of air and moisture sensitive reagents).
Chromatographic techniques (thin layer and column chromatography)
Structural analysis (NMR, EM, etc.)
Instrumental analysis (HPLC, GC, etc.)

Annex 1 (not to be printed)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Marc Montesinos Magraner

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S):

TITLE (Mandatory in English)

Radical Strategies for the Synthesis of Sulfonyl Fluorides

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

This project aims to develop radical-based approaches for the synthesis of sulfonyl fluorides from carbon-centered intermediates, assessing their efficiency, scope, and synthetic potential.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project will involve screening radical precursors and reaction conditions, followed by product isolation and characterization using standard techniques such as NMR spectroscopy, mass spectrometry, and chromatography.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 M Paz Clares García

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Synthesis and characterization of polyamine compounds containing pyrazole units for the recognition of anions of environmental interest

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Diseño y síntesis de receptores de naturaleza poliamínica con unidades de pirazol. Estudios para el reconocimiento de aniones de interés medioambiental.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Mediante rutas sintéticas diseñadas en el grupo de Química Supramolecular de la Universidad de Valencia, se sintetizarán diferentes receptores poliaminicos derivados de pirazol .Se emplearán técnicas de potenciometría, UV-Visible, RMN, fluorescencia... para los estudios de reconocimiento de aniones de interés medioambiental. Se buscará sistemáticamente la preparación de cristales adecuados para su resolución estructural por difracción de RX.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Salvador Gil Grau

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Modification of optical fibers for optoacoustic applications

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Surface modification of optical fibers with materials and organic compounds
- Study of the modulation of the optical signal according to the surface modification

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

- Synthesis of inorganic-organic material
- Characterization of the material
- Activation of the optical fiber
- Optimization of the method of covalent bond of the material on the fiber surface
- Determination of the degree of modification of the surface
- Study of the modification of the optoacoustic signal

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Salvador Gil Grau

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Design, synthesis and evaluation of sensors for the detection of chemical submission drugs

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Design and synthesis of chemosensors for different drugs
- Evaluation of its sensing capability
- Evaluation of its selectivity

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

From our experience and the bibliography, the more adequate sensor for a specific drug will be synthetized, using organic chemistry methodology.
After purification and structure elucidation, the chemosensor will be tested against different drugs used for chemical submission, and interferents. The limit of detection and range of quantification will be determined by UV-visible spectroscopy and fluorescence.

Annex 1 (not to be printed)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Amparo Sanz Marco

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Electrochemical Organocatalytic Strategies for Alkene Difunctionalization

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

-Sintesis de organocatalizadores
-Estudio de la optimización de la reacción para la funcionalización de alquenos

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Se llevarán a cabo reacciones orgánicas clásicas, empleadas para la síntesis de los organocatalizadores y reacciones electroquímicas para llevar a cabo reacciones orgánicas, en concreto en este trabajo reacciones de oxidación anódica.

Los productos obtenidos se caracterizarán mediante técnicas espectroscópicas.

El alumno debería adquirir competencias en los siguientes aspectos:
- Búsqueda bibliográfica.
- Técnicas de síntesis orgánica y electroquímica.
- Técnicas cromatográficas (cromatografía de capa fina y de columna)
- Análisis estructural (RMN, EM, etc.)
- Análisis instrumental (HPLC, CG, etc.)

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jose Antonio Sáez Cases

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Drug detection using nanomaterials

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

The objective of this Final Degree Project is the design, synthesis, and evaluation of nanomaterials based on MCM-41-type mesoporous silica nanoparticles functionalized with molecular gates for the selective detection of new psychotropic substances.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Sol-gel methods will be employed to synthesize MCM-41-type mesoporous silica nanoparticles, alongside organic synthesis techniques to prepare the molecular gates, and nanotechnology techniques to develop the hybrid nanomaterials (mesoporous silica nanoparticles with anchored molecular gates). Likewise, spectroscopic and spectrometric techniques will be used to characterize the final nanomaterials and evaluate their activity.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María Carmen Coll Merino

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Smart mesoporous nanocarriers activated by hypoxic enzymes for cancer therapy

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

The objective of this Final Degree Project is the design, synthesis, and characterization of smart hybrid nanomaterials based on MCM-41 mesoporous silica nanoparticles. These platforms are functionalized with molecular gates that respond to specific enzymes overexpresssed in hypoxic conditions, enabling the controlled release of cytotoxic drugs within the solid tumors microenvironment.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

MCM-41 mesoporous silica nanoparticles will be prepared via sol-gel methods, while the molecular gates will be obtained through organic synthesis. These components will then be assembled into hybrid nanomaterials using surface functionalization techniques. Finally, the resulting platforms will be characterized using spectroscopic and spectrometric tools, followed by functional assays to evaluate their hypoxia-triggered drug release activity.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Pau Arroyo Máñez

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Design and Development of Stimuli-Responsive Mesoporous Nanomaterials for Controlled Drug Delivery

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

The objective of this Final Degree Project is the design, synthesis, and characterization of hybrid nanomaterials based on MCM-41 mesoporous silica nanoparticles functionalized with molecular gates that respond to hypoxic conditions for the treatment of solid tumors through the controlled release of cytotoxic drugs.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Sol-gel methods will be employed to synthesize MCM-41-type mesoporous silica nanoparticles, alongside organic synthesis techniques to prepare the molecular gates, and nanotechnology techniques to develop the hybrid nanomaterials (mesoporous silica nanoparticles with anchored molecular gates). Likewise, spectroscopic and spectrometric techniques will be used to characterize the final nanomaterials and evaluate their activity.

Annex 1 (not to be printed)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Pablo Gaviña Costero

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Design, synthesis and characterization of chemosensors for optical drug detection

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Design and synthesis of chromo- or fluorogenic chemosensors for the detection of illicit drugs.
-Evaluation of their ability to detect the drug in a relevant medium

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

First the appropriate chemosensor wil be designed for a specific interaction with the drug. Then the chemosensor will be synthesized using classical organic chemistry procedures. The chemosensor will be purified using chromatographic techiques and properly characterized by 1H and 13 CNMR, as well as by UV-vis and fluorescence spectroscopies. Finally the chemosensor ability to detect the drug will be evaluated by UV-vis and/or fluorescence spectroscopies.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Alicia Monleón Ventura

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Enantioselective addition reactions of isocyanides

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

El objetivo de este trabajo consiste en el desarrollo de un método catalítico y enantioselectivo de adición de isocianuros a compuestos insaturados y el estudio de las condiciones de reacción para la obtención del correspondiente producto.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Para el estudio de la reacción de adición enantioselectiva, se llevará a cabo:
- Síntesis de los isocianuros y su caracterización mediante RMN, HRMS y punto de fusión (si procede).
- Optimización de las condiciones de reacción entre el isocianuro y el compuesto insaturado seleccionado. Para ello, se evaluarán diferentes catalizadores quirales, disolventes y aditivos, así como la influencia de la temperatura, la concentración y el tiempo de reacción en el rendimiento y la enantioselectividad de la reacción.
- Estudio del alcance y limitaciones de la reacción, aplicando las condiciones óptimas seleccionadas, utilizando compuestos de partida con sustituyentes de diferente naturaleza electrónica y estérica.
- Los productos obtenidos se caracterizarán mediante RMN, HRMS, punto de fusión (si procede), HPLC quiral y polarimetría.

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Alicia Monleón Ventura

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

The utilization of enzymes in asymmetric catalysis

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

El objetivo de este trabajo consiste en la realización de una revisión bibliográfica sobre los métodos de síntesis asimétrica catalizados por enzimas.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Se realizará la búsqueda bibliográfica de artículos científicos de revistas especializadas y libros a través de bases de datos de la UV y mediante la utilización de programas especializados como SciFinder.
Se recogerá la información relevante para la consecución del objetivo del proyecto, se organizará y se redactará la memoria.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 M PAZ CLARES GARCÍA

ACADEMIC TUTOR 2 JOSÉ MIGUEL LLINARES BERENGUER

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): QUÍMICA ORGÁNICA

TITLE (Mandatory in English)

Synthesis of Polyamine Ligands and Study of Their Anionic and Cationic Interactions

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

En este TFG se plantea la síntesis de receptores poliamínicos o poliamídicos lineales funcionalizados con anillos aromáticos y el estudio de su interacción con aniones o cationes.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

El proceso consistira en:
1.- Síntesis de los compuestos orgánicos objetivo y su caracterización empleando las técnicas tradicionales en Química Orgánica.
2.- Estudio de sus propiedades ácido/base empleando técnicas potenciometricas, RMN, UV_Vis, etc..
3.- Estudio de su interacción con especies aniónicas o catiónicas

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jorge Escorihuela Fuentes

ACADEMIC TUTOR 2 María González Béjar

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Near-Infrared Photocatalytic Trifluoromethylation of Indoles

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To develop a novel, efficient, and selective photoredox-catalyzed protocol for the trifluoromethylation of indoles under mild reaction conditions.

To investigate the scope and limitations of the reaction with respect to a variety of indoles.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project is structured into different stages over a period of 3-4 months, covering the conceptual design, experimental development, mechanistic investigation, and final analysis.

- Photocatalytic trifluoromethylation of indoles
- Optimization of reaction conditions to establish the optimal conditions for the photocatalytic reaction: solvents, photocatalyst loading, temperature, time, concentration, stoichiometry.

- Perform control experiments (no light, no catalyst, etc.)

- Substrate scope to explore the reaction scope with different indoles

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jorge Escorihuela Fuentes

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Near-Infrared Photocatalytic Trifluoromethylation of Alkenes

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To develop a novel, efficient, and selective photoredox-catalyzed protocol for the trifluoromethylation of alkenes under mild reaction conditions.

To investigate the scope and limitations of the reaction with respect to a variety of alkyne substrates.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project is structured into different stages over a period of 3-4 months, covering the conceptual design, experimental development, mechanistic investigation, and final analysis.

- Photocatalytic trifluoromethylation of alkenes
- Optimization of reaction conditions to establish the optimal conditions for the photocatalytic reaction: solvents, photocatalyst loading, temperature, time, concentration, stoichiometry.

- Perform control experiments (no light, no catalyst, etc.)

- Substrate scope to explore the reaction scope with different alkenes.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jorge Escorihuela Fuentes

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Departamento de Química Orgánica

TITLE (Mandatory in English)

Photocatalytic approach for the oxidation of boronic acids using near-infrared light

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

General Objective: Developement and evaluation a photocatalytic method for the oxidation of boronic acids under near-infrared (NIR) light irradiation

Specific Objectives:
Optimization of a photocatalytic system capable of absorbing and utilizing NIR light for the activation of boronic acid oxidation.
Investigation of substrate scope by testing a variety of aromatic and aliphatic boronic acids.
Elucidation of the reaction mechanism

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The study will begin with the selection and preparation of a series of aryl and alkyl boronic acids as model substrates. A range of photocatalysts including commercially available dyes will be evaluated. Reactions will be conducted under NIR light irradiation using LED sources, with control of temperature, solvent, and reaction time. Reaction conditions (photocatalyst loading, solvent, etc) will be optimized to achieve maximum conversion and selectivity. Products will be isolated and characterized using NMR spectroscopy, mass spectrometry, and IR spectroscopy. Mechanistic studies will be performed using radical scavengers, time-resolved spectroscopy, and control experiments in the absence of light or photocatalyst. Finally, the scope and limitations of the method will be assessed by applying the optimized conditions to a diverse set of boronic acid derivatives, evaluating yields, reaction rates, and functional group tolerance.

Annex 1 (not to be printed)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 MARCOS GIL SEPULCRE

ACADEMIC TUTOR 2 AMPARO SANZ MARCO

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): DEPARTMENT OF ORGANIC CHEMISTRY

TITLE (Mandatory in English)

Selective Electrocatalytic Carboxylation of Olefins

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

-To synthetize ligands incorporating anchoring functionalities and their metal complexes
-To immobilize prepared catalysts on electrodes
-To optimize the electrocatalytic performance of the molecular-based electrodes toward the carboxylation of olefins under CO_2 atmosphere.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project will start with the synthesis of ligands bearing anchoring groups suitable for immobilization on graphitic surfaces. These ligands will be coordinated to selected first-row transition metals to obtain molecular catalysts, which will be fully characterized using standard spectroscopic and analytical techniques (e.g., NMR, MS, EA, UV-vis).

The resulting catalysts will then be immobilized onto graphitic electrodes using appropriate anchoring strategies to generate molecular-based electrodes. These materials will be studied by electrochemical methods (e.g., cyclic voltammetry, controlled-potential electrolysis), and the electrocatalytic performance will be evaluated and optimized for the carboxylation of olefins under a CO_2 atmosphere. Activity, chemo- and regioselectivity, and durability will be systematically analysed.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 MARCOS GIL SEPULCRE

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): DEPARTMENT OF ORGANIC CHEMISTRY

TITLE (Mandatory in English)

Synthesis of fine-tuned ligands and catalysts for electrocatalytic reduction of unsaturated C-C bonds

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To synthesize a series of bipyridine-based ligands incorporating functional groups (π-delocalized systems, proton relays, and cationic groups), and their corresponding Ni-based complexes.

-To investigate and optimize the activity, regioselectivity, and chemoselectivity of the resulting systems toward the electrocatalytic hydrogenation of C-C unsaturated bonds (e.g., alkenes and alkynes).

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project will focus on the rational design and synthesis of bipyridine-based ligands incorporating π-delocalized systems, proton relays, and cationic groups, followed by coordination to nickel to generate a library of molecular electrocatalysts.

These systems will be evaluated for the selective electrocatalytic hydrogenation of alkenes, alkynes, and carbonyl compounds, with emphasis on activity, regioselectivity, and chemoselectivity as a function of ligand design.

The study will involve organic synthesis and characterization (NMR, MS, IR), synthesis of coordination compounds, and electrochemical techniques (cyclic voltammetry and controlled-potential electrolysis coupled with product analysis).

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Rosa Adam

ACADEMIC TUTOR 2 Rafael Ballesteros Garrido

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgànica

TITLE (Mandatory in English)

New Catalyst from Collapsed Hydrogels

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To design, synthesize, and characterize novel materials derived from polymers and metals, with controlled composition and structure.To evaluate the catalytic activity of the resulting materials in relevant chemical transformations, assessing their efficiency, selectivity, and potential for reuse under mild reaction conditions.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Hydrogels will be prepared by dissolving poly(vinyl alcohol) (PVA) in water at 80–90 °C, followed by the incorporation of metal sulfate salts under continuous stirring. Borax will be subsequently added as a crosslinking agent to induce gel formation and obtain mechanically stable hydrogel networks. After gelation, the resulting materials will be thoroughly washed, dried, and thermally treated in air at 400–600 °C to yield the corresponding catalytic materials.The obtained solids will be characterized using a combination of analytical techniques, including X-ray diffraction (XRD) to determine crystalline phases, inductively coupled plasma optical emission spectroscopy (ICP-OES) to quantify metal content, elemental analysis to assess composition, and Raman spectroscopy to provide structural information.Catalytic performance will be evaluated in hydrogenation reactions conducted in a high-pressure autoclave under a hydrogen atmosphere. The reduction of nitrobenzene derivatives will be used as a model reaction. Reaction progress and product distribution will be monitored by nuclear magnetic resonance (^{1}H NMR) spectroscopy.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Rosa Adam

ACADEMIC TUTOR 2 Rafael Ballesteros Garrido

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgànica

TITLE (Mandatory in English)

Synthesis of Nitrogen-Containing Heterocycles

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To develop efficient synthetic methodologies for the preparation of fluorescent polyaromatic structures, and to investigate the relationship between their molecular architecture and photophysical properties, with the aim of identifying new functional materials for potential applications in sensing, optoelectronics, and advanced materials.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The student will carry out the synthesis of various fluorescent polyaromatic structures through tailored synthetic strategies based on modern organic transformations, employing suitable aromatic precursors as starting materials. These reactions will be conducted under controlled conditions, using appropriate catalytic systems, and monitored over time in order to optimize key parameters such as temperature, reaction time, solvent selection, and catalyst loading.Product identification and purity will be confirmed using standard analytical techniques, including thin-layer chromatography (TLC), nuclear magnetic resonance spectroscopy (^{1}H and ^{13}C NMR), and mass spectrometry (MS). In addition, infrared spectroscopy (IR) will be employed to assess functional group transformations, and UV–Vis and fluorescence spectroscopy will be used to evaluate the photophysical properties of the synthesized compounds.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Rosa Adam

ACADEMIC TUTOR 2 Rafael Ballesteros Garrido

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgànica

TITLE (Mandatory in English)

New Metal Harversters

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To design, synthesize, and evaluate novel adsorbent materials for the efficient removal of toxic heavy metal ions from aqueous solutions. The performance of the developed materials will be assessed in terms of adsorption capacity, selectivity, and reusability under environmentally relevant conditions. Metal uptake will be quantified using atomic absorption spectroscopy (AAS) and/or inductively coupled plasma optical emission spectroscopy (ICP-OES), depending on availability.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Novel adsorbent materials will be synthesized, potentially based on functionalized biopolymers, hybrid organic–inorganic matrices, or modified clay minerals. The resulting materials will be characterized in terms of morphology, functional group composition, and thermal stability using techniques such as Fourier-transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM), depending on instrumentation availability.Batch adsorption experiments will be performed by exposing aqueous solutions containing known concentrations of toxic heavy metal ions to the synthesized materials under controlled conditions, including pH, contact time, and temperature. Following separation of the solid phase, residual metal concentrations in the supernatant will be quantified using flame or graphite furnace atomic absorption spectroscopy (AAS), enabling the determination of adsorption capacities, removal efficiencies, and, where applicable, adsorption isotherms.

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Andrea Olmos Vergé

ACADEMIC TUTOR 2 María del Carmen Ramírez de Arellano Sánchez

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Study of catalytic methods for the obtention of azacompounds

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Determination of the scope of raw substrates for the catalityc introduction of nitrogen moieties on unsaturated derivatives.
- Design and synthesis of potential electrophilic catalysts of 3d metals for the increase of molecular functionality.
- X-ray crystal structure determination and study of intermediates.
- Study of the catalytic activity in synhtesis of azacompounds.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Theoretical/practical introduction to the synthesis of metal complexes in inert conditions (use of Schlenk line and dry box) and crystallization of metallo-organic systems.
- Theoretical and practical initiation to the catalytic processes for hydroamination of unsaturated C-C bonds.
- Theoretical/practical introduction to structural determination using single-crystal X-ray diffraction, including: crystal isolation and treatment, diffractometer handling, use of computer programs for data processing and interaction studies.
- Theoretical/practical initiation to the spectroscopic characterization of the characterized systems.

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Andrea Olmos Vergé

ACADEMIC TUTOR 2 María del Carmen Ramírez de Arellano Sánchez

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Design of partially intermolecular [2+2+2]-cyclization for the acces of chromane and quinoline cores

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Determination of the scope of raw substrates for the catalityc cyclization heterodiynes with internal alkynes.
- Design and synthesis of potential electrophilic catalysts of 3d metals for the increase of molecular complexity.
- X-ray crystal structure determination and study of intermediates.
- Study of the catalytic activity in heterocycle formation processes.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

- Theoretical/practical introduction to the synthesis of metal complexes in inert conditions (use of Schlenk line and dry box) and crystallization of metallo-organic systems.
- Theoretical and practical initiation to the catalytic processes for cyclization of polyinsaturated compounds.
- Theoretical/practical introduction to structural determination using single-crystal X-ray diffraction, including: crystal isolation and treatment, diffractometer handling, use of computer programs for data processing and interaction studies.
- Theoretical/practical initiation to the spectroscopic characterization of the characterized systems.

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María del Carmen Ramírez de Arellano Sánchez

ACADEMIC TUTOR 2 Andrea Olmos Vergé

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Development of tandem cyclization/functionalization reactions catalyzed by 3d metals

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Determination of the scope of raw substrates for the catalityc cyclization of polyinsaturated derivatives.
- Design and synthesis of potential electrophilic catalysts of 3d metals for the increase of molecular complexity.
- X-ray crystal structure determination and study of intermediates.
- Study of the catalytic activity in heterocycle formation processes.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

- Theoretical/practical introduction to the synthesis of metal complexes in inert conditions (use of Schlenk line and dry box) and crystallization of metallo-organic systems.
- Theoretical and practical initiation to the catalytic processes for cyclization of polyinsaturated compounds.
- Theoretical/practical introduction to structural determination using single-crystal X-ray diffraction, including: crystal isolation and treatment, diffractometer handling, use of computer programs for data processing and interaction studies.
- Theoretical/practical initiation to the spectroscopic characterization of the characterized systems.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María González Béjar

ACADEMIC TUTOR 2 Jorge Escorihuela Fuentes

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Synthesis of cyanines for near-Infrared Photocatalysis

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To synthetize rigid cyanines for selective photoredox-catalyzed reactions.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project is structured into different stages over a period of 3-4 months, covering the conceptual design, experimental development, mechanistic investigation, and final analysis.

- Synthesis of rigid cyanines.
- Photocatalytic tests to establish the optimal reaction conditions: solvents, photocatalyst loading, temperature, time, concentration, stoichiometry.

- Perform control experiments (no light, no catalyst, etc.)

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María González Béjar

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Synthesis of core-shell upconversion nanoparticles

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Main Objective:
To synthesize photoactive upconversion nanoparticles (UCNPs), and to derivatize them with inactive shells in order to enhance their optical properties for potential applications in photocatalysis.
Specific Objectives:
- To design, synthesize, and characterize upconversion nanoparticles (UCNPs).
- To derivatize the synthesized UCNPs with inactive shells to improve their surface chemistry and improve their photocatalytic performance.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project will be carried out in several stages, combining wet-chemical synthesis techniques with advanced characterization methods:

1. Synthesis of upconversion nanoparticles
2. Derivatization with inactive shells
3. Characterization:
Transmission Electron Microscopy (TEM): For morphology and size distribution.
X-ray Diffraction (XRD): To confirm crystal phase and structural integrity.
Fourier Transform Infrared Spectroscopy (FTIR): To analyze surface functional groups.
Dynamic Light Scattering (DLS): For hydrodynamic size and colloidal stability.
Photoluminescence Spectroscopy: To measure emission spectra and quantum yield.
4. Data Analysis and Interpretation
5. Documentation and Reporting

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Rafael Ballesteros Garrido

ACADEMIC TUTOR 2 Rosa Adam

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

New Materials from Biopolymers

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To develop and characterize novel materials derived from biopolymers.

To evaluate the antimicrobial properties of biopolymer-based materials and assess their potential use in applications requiring bacterial.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Biopolymer-based hydrogels will be prepared using conventional synthesis techniques, involving the dissolution of the polymer in aqueous media under controlled temperature and stirring conditions. Once formed, the hydrogels will be loaded with active agents for subsequent release studies. The release profile of these agents will be monitored using UV-Vis spectroscopy to evaluate diffusion behavior over time. Structural and chemical characterization of the materials will be carried out using powder X-ray diffraction (PXRD), inductively coupled plasma optical emission spectrometry (ICP-OES), and ion chromatography. This methodology will not only enable the student to understand the fundamentals of material synthesis and characterization, but also to acquire hands-on experience with advanced instrumental techniques and data interpretation. In doing so, the project will promote the development of critical scientific skills and reinforce the student's training in experimental research within the field of sustainable materials.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Rafael Ballesteros Garrido

ACADEMIC TUTOR 2 Rosa Adam

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Development of Novel Materials for the Capture of Mercury and Cadmium from Aqueous Media

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To design, synthesize, and evaluate new adsorbent materials for the efficient removal of mercury (Hg^{2+}) and cadmium (Cd^{2+}) ions from aqueous solutions, and to quantify metal uptake using atomic absorption spectroscopy (AAS).

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Novel adsorbent materials will be synthesized, potentially based on functionalized biopolymers, hybrid organic-inorganic matrices, or modified clays. These materials will be characterized in terms of morphology, functional group content, and thermal stability using techniques such as Fourier-transform infrared spectroscopy (FTIR), thermogravimetric analysis (TGA), and scanning electron microscopy (SEM), depending on availability. The adsorption experiments will be carried out by exposing known concentrations of Hg^{2+} and Cd^{2+} solutions to the synthesized materials under controlled pH, time, and temperature conditions. After separation, residual metal concentrations in the supernatants will be quantified using flame or graphite furnace atomic absorption spectroscopy (AAS), allowing for the determination of adsorption capacities and removal efficiencies. This methodology will provide the student with hands-on experience in materials synthesis, analytical chemistry, and environmental applications.

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Jose Antonio Sáez Cases

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Departamento de Química Orgánica

TITLE (Mandatory in English)

Liposomal nanoparticles in oncological treatments

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To evaluate, through a literature review, the current status and future prospects of using liposomal nanoparticles as controlled drug delivery systems in oncological treatments, analyzing their impact on therapeutic efficacy and the reduction of systemic toxicity.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

For this bibliographic work, a systematic literature review was conducted using reference scientific databases (such as PubMed, Scopus, and Web of Science). The document selection focused on research articles, reviews, and clinical trials from the last 5 years, prioritizing high-impact publications in nanomedicine and oncology. Finally, the extracted information was critically analyzed, categorizing the studies according to the liposomal design, the targeting mechanisms employed, and their impact on clinical efficacy and safety compared to conventional therapies.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Pau Arroyo Máñez

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Surface Functionalisation of Optical Fibres for Optoacoustic Wave-Based Sensors

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Surface modification of optical fibers with materials and organic compounds
- Study of the modulation of the optoacustic wave signal according to the surface modification

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

- Synthesis of inorganic-organic material
- Characterization of the material
- Activation of the optical fiber
- Optimization of the method of covalent bond of the material on the fiber surface
- Determination of the degree of modification of the surface
- Study of the modification of the optoacoustic signal

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Santiago Díaz Oltra

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Integrating a Gender Perspective into Organic Chemistry Education

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Intentar evitar que todos los referentes que se utilizan en la docencia de química orgánica sean masculinos, por lo que se buscarán referentes femeninos para su incorporación en el aula.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Búsqueda y análisis de la bibliografía disponible sobre el tema en cuestión con diferentes herramientas de búsqueda.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Mª del Mar Ríos Gutiérrez

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgànica

TITLE (Mandatory in English)

Molecular Dynamics in the search of novel antidepressants

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Caracterizar mediante dinámica molecular las interacciones entre posibles candidatos a antidepresivos y proteínas implicadas en la depresión, comparando su comportamiento con el de fármacos actualmente utilizados e identificando compuestos con perfiles favorables.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Se realizarán simulaciones de dinámica molecular de los complejos proteína-ligando y se analizarán su estabilidad y principales interacciones. Los resultados se complementarán con estudios farmacocinéticos ADMET y análisis QSAR.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 María González Béjar

ACADEMIC TUTOR 2 Rafael Muñoz-Espí (Physical Chemistry)

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Organic Chemistry

TITLE (Mandatory in English)

Photoactive Nanoparticles Prepared by Miniemulsion Polymerization

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

- Selection and, if appropriate, preparation of organic compounds with chromophore ability that can be fixed on the surface of polymeric nanoparticles.

- Preparation and characterization of nanoparticles functionalized with the chosen photoactive groups.

- Application of the systems prepared in photocatalysis.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The work will begin with the preparation of photocatalytic compounds that can be incorporated into the surface of organic polymeric nanoparticles prepared by miniemulsion polymerization. There are two possible strategies: either the ligands incorporate a polymerizable group, or they incorporate a group capable of reacting with functional groups present on the surface of the previously prepared nanoparticles.

In the second phase, nanoparticles incorporating the photoactive compounds of the previous stage will be prepared.

Synthetic parameters will be optimized and the compounds and particles prepared will be characterized by using the appropriate analytical techniques.

The photocatalytic activity of the systems for model reactions of interest will be evaluated.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Raquel E. Galian Baca

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Perovskite nanomaterials: a new platform for organic photocatalysis

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Preparation and characterization of novel perovskites nanomaterials with improved optoelectronic properties.

Evaluate the photocatalytic activity of the as-synthesized nanomaterials in organic chemistry transformation using model reactions.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

This project will be conducted throught the following steps:

1- Critical literature review of the current state of the art on perovskite nanomaterials for photocatalysis.
2- Synthesis of perovskite nanomaterials by solution-based methods and structural, morphological and optical characterization using UV-VIS absorption and photoluminescence spectroscopy, X-ray diffraction and Raman Spectroscopy.
3- Study of the photocatalytic performance under controlled irradiated conditions for model reactions in organic chemistry and investigate the underlying photocatalytic mechanism.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Raquel E. Galian Baca

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Engineering sustainable nanomaterials with tunable luminescent properties

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Preparation of metal-free nanomaterials with tunable luminescent properties and investigate the relationship between their composition, structure, and optical performance.

Optimize the synthetic parameter to obtain highly fluorescent nanomaterials, from blue to red emission, based on carbon.

Evaluate the biocompatibility of the nanomaterials for bioapplications.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

This project will be conducted throught the following steps:

1- Critical literature review of the current state of the art on synthetic procedures for carbon based nanomaterials.
2- Prepare the nanomaterials and characterize by complementary techiques such as UV-VIS absorption and photoluminescence spectroscopy, X-ray diffraction and Raman Spectroscopy.
3- Evaluate the biocompatibility of the nanomaterials.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Raquel E. Galian Baca

ACADEMIC TUTOR 2 Soranyel Gonzalez Carrero

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

Advanced hybrid materials for optoelectronic applications

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

Develop and optimize hybrid materials based on organic semiconductors and metal halide perovskites, prepared as nanoparticles and thin films for optoelectronic applications.

The project will investigate the influence of materials composition, mixing ratios, and processing conditions on the structural, optical, and photophysical properties of the hybrid systems, with the aim of identifying those materiales that exhibit improved light absorption properties.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

The project will begin with a comprehensive literature review on hybrid organic semiconductor–perovskite materials and their applications in optoelectronic devices. Hybrid systems will then be prepared by combining organic semiconductors and perovskite materials as nanoparticles and/or thin films using solution-based processing techniques.

The synthesized materials will be characterized using several spectroscopic techniques, including UV–Vis absorption, photoluminescence spectroscopy, dynamic light scattering (for nanoparticles). In addition, their morphology will be analyzed by transmission electron microscopy (TEM) and/or atomic force microscopy (AFM).

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Raquel E. Galian Baca

ACADEMIC TUTOR 2 Teresa Delgado Pérez

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica- Química Física

TITLE (Mandatory in English)

Experimental synthesis and persistent luminescence properties of doped lead-free inorganic perovskites

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

To synthesize lead-free all-inorganic halide perovskites doped with alternative cations/anions using wet-chemistry methods.
To optimize dopant concentrations to maximize both the long-persistent luminescence (afterglow) lifetime and the photoluminescence quantum yield at room temperature.
To structurally characterize the prepared materials using Powder X-ray Diffraction and evaluate their steady-state and time-resolved fluorescence properties.
To investigate the underlying charge trapping storage mechanism.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Synthesis of lead-free and doped perovskite nanocrystals using solution-based methods, such as hydrothermal or co-precipitation techniques.
Optical Characterization: the structural and photophysical properties of the synthesized materials will be investigated using X-ray diffraction (XRD), steady-state and time-resolved photoluminescence spectroscopy, including excitation and emission spectra and afterglow decay measurements.
Charge trap states and their distribution will be evaluated by thermoluminescence spectroscopy in collaboration with a partner research group.

Annex 1 (**not to be printed**)

VNIVERSITAT DE VALÈNCIA Facultat de Química

DEGREE FINAL PROJECT
CHEMISTRY DEGREE

ACADEMIC TUTOR 1 Ana C. Cuñat Romero

ACADEMIC TUTOR 2

EXTERNAL TUTOR (if needed):

DEPARTMENT(S): Química Orgánica

TITLE (Mandatory in English)

How tyres are turning green.

OBJECTVES / OBJECTIUS / OBJETIVOS: (Choose the language)

The TFG aims to study the evolution over the years the materials use for tyres manufacturing

El objetivo del trabajo es hacer un estudio evolutivo sobre los materiales empleados para la fabricación de los neumáticos. Haciendo especial hincapié en una manufactura más sostenible medioambientalmente.

METHODOLOGY / METODOLOGIA / METODOLOGÍA: (Choose the language)

Tomando como base referencias actualizadas, ampliar la búsqueda sobre el tema indicado.

Desarrollar un informe que recoja los aspectos más relevantes de los objetivos planteados arriba.