

Marcos García Suero

Group Leader at Institute of Chemical Research of Catalonia ICIQ-CERCA

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Biographical Sketch

I was born in Noreña (Asturias) in 1981. I graduated in Chemistry from the Universidad de Oviedo in 2003 and I started my scientific career working on vinylidene and allenylidene organometallics in the laboratory of Prof. José Gimeno and Prof. Pilar Gamasa. In February 2009, I obtained my PhD degree at the Institute of Organometallic Chemistry Enrique Moles and Department of Organic and Inorganic Chemistry (Universidad de Oviedo), where I worked under the direction of Prof. José Barluenga and Prof. Josefa Flórez on Fischer carbene chemistry. During the summer of 2005 I joined the laboratory of Prof. Andrew Myers at Harvard University working on the synthesis of tetracycline antibiotics as a PhD student. In May 2010, I moved to the University of Cambridge to work with Prof. Matthew Gaunt on copper catalysis and methionine bioconjugation as a Postdoctoral Marie Curie Fellow. In 2014, I was awarded with the Starting Career Programme (SCP) at the Institute of Chemical Research of Catalonia (ICIQ) by the Scientific Advisory Board. In May 2018, I successfully passed a midterm evaluation and in June 2020 I was promoted to Senior Group Leader. From April 2021, I am tenured Group Leader at ICIQ.

Educational/Professional Experience

From April 2021	Tenured Group Leader at (ICIQ).
From 2020	Senior Group Leader (ICIQ).
2014 – 2020	Junior Group Leader at the Institute of Chemical Research of Catalonia (ICIQ) .
2010 – 2014	Postdoctoral Researcher. Advisor: Professor Matthew Gaunt, University of Cambridge (UK). <i>Development of new copper-catalyzed reactions and methionine bioconjugation with hypervalent iodine reagents.</i>
2003 – 2009	PhD studies. Advisors: Professors José Barluenga, Josefa Flórez, Universidad de Oviedo . <i>Thesis title: Diastereoselective multicomponent cyclizations of Fischer alkoxycarbene complexes, lithium enolates and unsaturated organometallics.</i> (2 nd February 2009; <i>Cum Laude</i>). Continued working as postdoctoral fellow in the same group until my next position in UK.
2005 (3 months)	Internship in the group of Professor Andrew Myers, Harvard University (USA). <i>Total synthesis of novel tetracycline antibiotics.</i>
2002 – 2003	Undergraduate research internship. Advisor: Professor José Gimeno, Universidad de Oviedo . <i>Synthesis of novel cumulenyliidene ruthenium complexes with nonlinear optic properties.</i>
1999 – 2003	BSc Chemistry, University of Oviedo.

Summary of the independent research career

I have built a research group of 1 Master student, 7 PhD students and 7 postdoctoral researchers through successfully applying for a series of grants from the European Research Council (ERC CoG 2019), Spanish Research Agency, Marie S. Curie Actions, BBVA Foundation and start-up funds from the ICIQ Starting Career Programme. Raising a total funding above 4 million Euros has been possible mainly because of the success of my pioneering research concepts, which has allowed me to develop a rigid publication strategy of only reporting our results in the very best international peer-reviewed journals. *Although in the early stages of my career, our group has gained international recognition on the generation of conceptually-novel radical carbenoids, carbyne equivalents and metal-carbynoids.* These discoveries have been published in top journals (*Nature, Angewandte, JACS, Chemical Science*), delivered three patents, and one patented reagent was commercialized in the Professor Product portal of [Sigma-Aldrich](#). I am frequently invited to deliver talks at

Top Universities in America, Europe, Japan, China, Singapore, Conferences and pharmaceutical companies and I was recognized with some of the most reputed prizes to young researchers in Spain and Europe, including: *JSP Travel Award 2018* from the Swiss Chemical Society to attend the 54 B rgerstock Conference, the *Merck Sigma-Aldrich Young Researcher Award 2018* from the Royal Spanish Chemical Society (RSQE), the *2019 Thieme Chemistry Journal Award*, the *Young Investigator Award 2019* by the EuCheMS Division of Organic Chemistry, the Leonardo fellowship 2019 from the BBVA Foundation and the *Young Investigator Award 2020* from Eli Lilly & RSQE. Moreover, our Group has been recognized by the Generalitat de Catalunya (AGAUR) as Emerging Group SGR 2017-2019. Especially important, it is the recognition that my PhD student (Ana Garc a Herraiz, now Principal Scientist at Firmenich) has obtained with her thesis. She has obtained some of the most prestigious national and international awards and distinctions that a PhD student could obtain, including the Pioneer Award 2019 (CERCA), RSEQ-Lilly Award 2019, poster award in the Worldwide REAXYS PhD Prize 2019 and 1st position in the Spanish REAXYS-RSEQ Early Researcher Award 2018. In addition, one of the first postdoctoral researchers of the group (Dr Zhaofeng Wang,) was recognized with the Suschem POSTDOC Award for the best publication in 2018 since Dr Wang was first author in the *Nature* article of the group (see below for details). Dr Wang has started his independent career in China and was recently awarded with the Thousand Talent programme. This grant can be considered as competitive as the ERC grants.

In June 2020, after being positively evaluated by ICIQ's Scientific Advisory Board*, I was promoted to Senior Group Leader and from April 2021 I am a tenured Group Leader at ICIQ

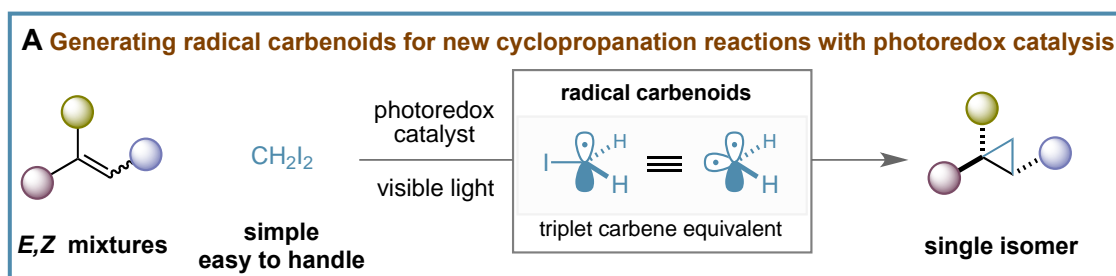
*Prof. Stephen Buchwald (BBVA Frontiers of Chemistry 2015, Prize Wolf Prize in Chemistry 2019), Prof Melanie Sanford (Michigan University, Blavatnik Award 2017), Prof Erick Carreira (ETH, Ryoji Noyori Prize 2021), Prof. Sir David MacMillan (Princeton University, Nobel Prize 2021), Prof. Jes s Jimenez Barbero (CICbioGUNE, Gold Medal RSQE)

HIGHLIGHTS

New cyclopropanation reactions with radical carbenoids enabled by photoredox catalysis.

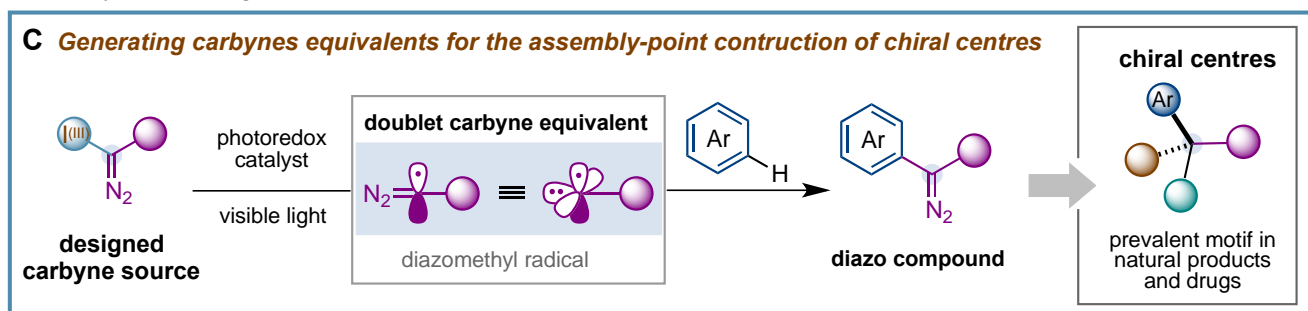
The catalytic transfer of a methylene group to alkene molecules for the synthesis of cyclopropane cores is a long-standing challenge in chemical synthesis. At present, classical protocols rely on the use of iodomethylzinc reagents, diazomethane or sulfur ylides, which possess problems with efficiency, availability, and safety. Although reliable control of the stereochemistry is achieved, these processes remained confined to the utilization of isomeric pure alkenes.

Our group reported the first stereoconvergent cyclopropanation reaction by means of photoredox catalysis using diiodomethane as the methylene source (A). We have demonstrated that the process involves iodomethyl radical (\bullet)CH₂-I, a triplet carbene equivalent that we termed radical carbenoid, able to transfer a CH₂ group to a wide range of *E,Z*-alkene mixtures in a stereocontrolled manner. Notable features of this process are its mild conditions, broad functional group compatibility, and excellent selectivity profile. This work resulted in two publications, *Angewandte Chemie* and *European Journal of Organic Chemistry*, and was highlighted in the cover of *Angewandte*.



Generating carbyne equivalents with photoredox catalysis

We have pioneered the generation of neutral **carbyne equivalents** by means of photoredox catalysis (C). This study revealed the underexploited dual carbene/radical behavior and ability of neutral carbynes to form three new bonds; and provided the fundamentals to an “assembly-point” functionalization for chiral centre sequencing through diazo compounds. Key on this study was the design of stable carbyne sources decorated with a hypervalent iodine moiety $\text{I}^{\text{(III)}}$ ($\text{I}^{\text{(III)}}$ represents $-\text{I}^{\text{(III)}}(\text{Ar})(\text{OTf})$) and a diazo functionality ($=\text{N}_2$). Catalytic single-electron reduction selectively “unmasked” the $\text{I}^{\text{(III)}}$ moiety, generating an electrophilic diazomethyl radical ($\text{N}_2=\text{C}(\bullet)-\text{R}$) as direct carbyne equivalent, able to cleave aryl C–H bonds in feedstock chemicals and medically relevant agents.



This work was published in *Nature* and highlighted on Nature News & Views, CEN, Chemistry World and mentioned on the cover of Nature. The innate ability of monovalent carbons to form three new bonds suggest that methodologies based on carbynes, may have the ability to streamline chemical synthesis and to reach previously unattainable chemical space in the pharmaceutical sector (among others). In fact, this work has recently been highlighted by medicinal chemists from Merck in a review of *Science* magazine (*Science* 363, (2019) eaat0805) as the latest of a series of very diverse, practical, and potentially impactful uses of photoredox techniques to assemble libraries of drug-like scaffolds for screening, and also in *Nature Reviews Drug Discovery* journal (*Nat. Rev. Drug Discov.* 17, 709 (2018)) by medicinal chemists from Astra Zeneca and GSK.

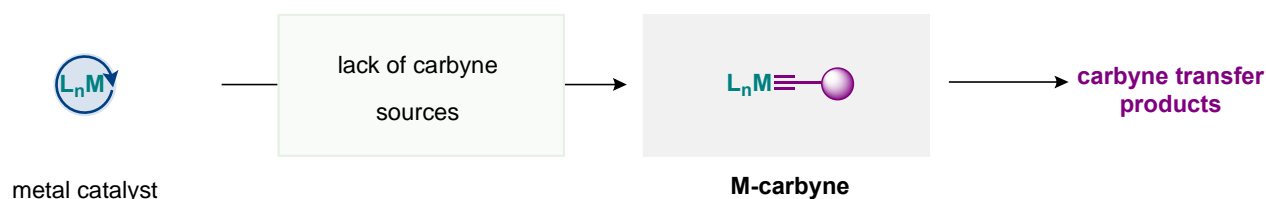
Catalytic cleavage of carbon–carbon double bonds with Rh-carbynoids

For more than half a century, the discovery of new metal-carbon bond-forming strategies has been cornerstone in the development of transition-metal catalysis. The catalytic formation of organometallic intermediates with metal-carbon single/double bond – such as metal–L (L = alkyl, alkenyl, alkynyl, aryl), metal-carbene (metal=L) – is commonly used in reaction discovery as well as in the synthesis of natural products, pharmaceuticals and functional materials. However, while metal-carbynes – the organometallic species with a metal-carbon triple bond (metal \equiv L) –, have been key players as catalysts in alkyne metathesis, their general application in catalytic carbyne transfer processes to organic matter has been largely unexplored; mainly due to the lack of suitable carbyne sources that enable the catalytic monovalent ligand transfer. To circumvent this problem, we sought to develop a platform based on the catalytic generation of equivalent forms of metal-carbynes or metal-carbynoids with dual carbene/carbocation behaviour able to uncover a new catalytic alkene activation (D). Recently, we have discovered a catalytic strategy that generates rhodium-carbynoids by selective diazo activation of designed carbyne sources with rhodium paddlewheel complexes. We found that our equivalents provoke C–C bond scission by inserting a cationic monovalent carbon unit between both sp^2 -

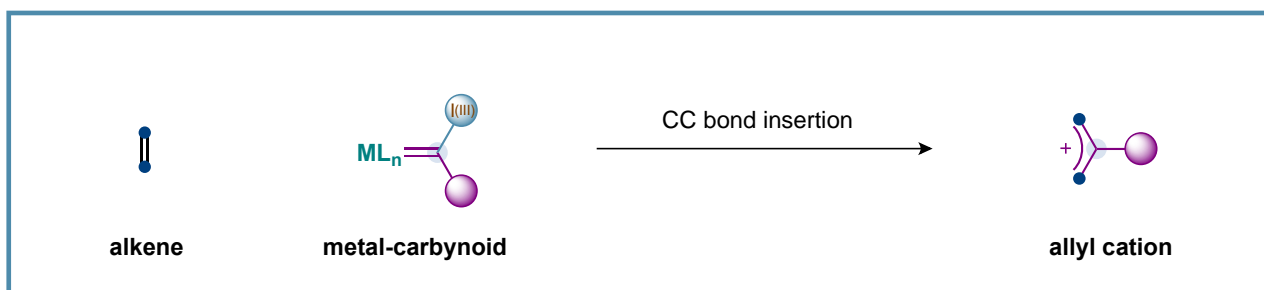
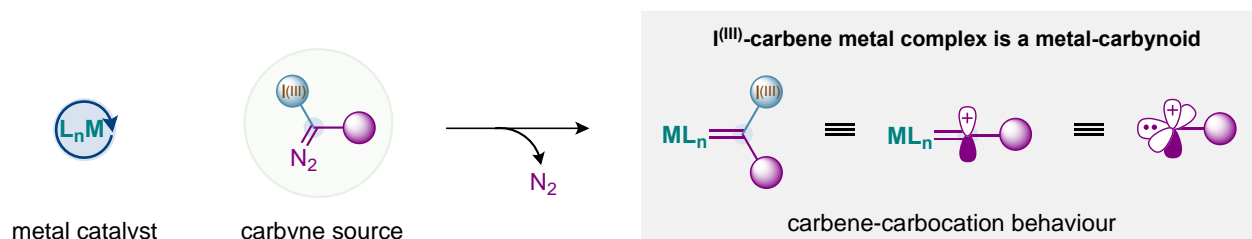
hybridized carbons. This skeletal remodeling process accesses synthetically useful allyl cation intermediates that conduct to valuable allylic building blocks upon nucleophile attack. Our results rely on the formation of cyclopropyl- $I^{(III)}$ intermediates able to undergo electrocyclic ring-opening, following the Woodward–Hoffmann–DePuy rules. Furthermore, the insertion of a monovalent carbon unit in C–C bonds underscores an opportunity in skeletal editing that will be relevant to reach previously unattainable chemical space in drug discovery. This work was published in the Journal of the American Chemical Society in September 2019 and has been seen over 12000 times in the JACS ACS web, highlighted in *Chemistry Views* and *Chemistry World.*, and was one of the most read article in September 2019 and was among the Top 20 most downloaded and most read articles within the last 12 months of publication.

D Catalytic generation of metal-carbynoids for discovering new transformations

■ Long-standing problem: catalytic generation of metal-carbynes



■ Can we generate metal-carbynoids to discover C-C bond insertion reactions?



Awards

- 2022 **SGR Consolidated Group.** Recognition by the Generalitat de Catalunya (AGAUR)
- 2020 **Young Investigator 2020** (Eli Lilly-RSQE)
- 2019 **ERC Consolidator Grant** (European Commission)
- 2019 **Leonardo Award 2019** (BBVA Foundation)
- 2019 **Young Investigator Award** (EuChemS -Organic Division)
- 2019 **Thieme Chemistry Journal Award**
- 2018 **JSP Travel Award** from the Swiss Chemical Society for the 53rd Bürgenstock Conference
- 2018 **Merck Sigma-Aldrich Young Researcher Award** (RSQE)

Publications

Independent research

• *Chem. Rev.* **2023**, invited review by Prof. Dean Toste. Late-stage functionalization for the creation of chiral centers from C–H bonds. Hang-Fei Tu, Karen de la Vega-Hernandez, Teo Wei Jie, Marcos G. Suero*.

• *J. Am. Chem. Soc.* **2023**, accepted manuscript. Generating Fischer-type Rh-carbenes with Rh-carbynoids. Eric Palomo, Akhilesh K. Sharma, Zhaofeng Wang, Liyin Jiang, Feliu Maseras*, and Marcos G. Suero* DOI: 10.1021/jacs.3c00012.

• *J. Am. Chem. Soc.* **2022**, *144*, *37*, 16737. Catalytic Synthesis of Cyclopropenium Cations with Rh-Carbynoids. Hang-Fei Tu, Aliénor Jeandin, Marcos G. Suero*.

*Among the [most read articles in September 2022](#)

• *Chem. Sci.* **2022**, *13*, 4327. Catalytic alkene skeletal modification for the construction of fluorinated tertiary stereocenters. Liyin Jiang, Pau Sarró, Wei Jie Teo, Jordi Llop, Marcos G. Suero*.

• *Angew. Chem. Int. Ed.* **2021**, *60*, 6177. β -Diazocarbonyl compounds: synthesis and their Rh(II)-catalyzed 1,3 C-H insertions. Liyin Jiang, Zhaofeng Wang, Melanie Armstrong, Marcos G. Suero*.

- Chosen as “hot paper” by the editors for its importance and high interest.

• *J. Am. Chem. Soc.* **2019**, *141*, 15509. Catalytic cleavage of C(sp²)-C(sp²) bonds with Rh-carbynoids. Zhaofeng Wang, Liyin Jiang, Pau Sarró, Marcos G. Suero*.

***Highlighted in [Chemistry Views & Chemistry World](#)

***Among the [most read articles in September 2019](#)

***Among the [Top 20 most downloaded and most read articles](#) within the last 12 months of publication.

• *Chem. Sci.* **2019**, *10*, 9374. A transition-metal-free & diazo-free styrene cyclopropanation. Ana G. Herraiz, Marcos G. Suero*.

• *Synthesis*, **2019**, *51*, 2821. New Alkene Cyclopropanation Reactions Enabled by Photoredox Catalysis via Radical Carbenoids. Ana G. Herraiz, Marcos G. Suero*. Invited review by Prof. Paul Knochel for the Bürgenstock Conference Special Issue.

• *Nature*, **2018**, *554*, 86. Generating carbyne equivalents with photoredox catalysis. Zhaofeng Wang, Ana G. Herraiz, Ana M. del Hoyo, Marcos G. Suero*.

***Highlighted in the [cover](#) of *Nature*.

***Highlighted in [C&EN](#), [Chemistry World](#), [Nature News & Views](#), and [La Vanguardia](#).

***This process has been highlighted by medicinal chemists from Merck in a review of [Science magazine](#) as the latest of a series of very diverse, practical, and potentially impactful uses of photoredox techniques to assemble libraries of drug-like scaffolds for screening, and also in [Nature Reviews Drug Discovery](#) journal by medicinal chemists from Astra Zeneca and GSK.

For a video directed to the general public watch: [Carbynes – The new piece of chemistry's Lego](#).

• *Eur J. Org. Chem.* **2017**, 2122. Photoredox-catalyzed Cyclopropanation of Michael Acceptors. Ana M. del Hoyo, Marcos G. Suero*. *Invitation to Special Issue on Photoredox Catalysis by Burkhard König (Guest Editor)*. –Among the most accessed articles in February 2017 – Selected as Very Important Paper – Highlighted in [Chemistry Views](#).

• *Angew. Chem. Int. Ed.* **2017**, 56, 1610. A Stereoconvergent Cyclopropanation Reaction of Styrenes. Ana M. del Hoyo, Ana G. Herraiz, Marcos G. Suero*.

***Selected as Front Cover.

***Among the most accessed articles in December 2016.

Postdoctoral studies

• *Nature*, **2018**, 562, 563. A protein functionalization platform based on selective reactions at methionine residues. Michael T. Taylor, Jennifer E. Nelson, Marcos G. Suero, Matthew J. Gaunt.

• *J. Am. Chem. Soc.* **2014**, 136, 8851. Cu-catalyzed Cascades to Carbocycles: Union of Diaryliodonium Salts with Alkenes or Alkynes Exploiting Remote Carbocations. F. Zhang, S. Das, A. Walkinshaw, A. Casitas, M. Taylor, M. G. Suero, M. J. Gaunt.

• *J. Am. Chem. Soc.* **2013**, 135, 12532. Copper-Catalyzed Carboarylation of Alkynes via Vinyl Cations. A. J. Walkinshaw, W. Xu, M. G. Suero, M. J. Gaunt.

• *Angew. Chem. Int. Ed.* **2013**, 52, 5799. Copper-Catalyzed Arylative Meyer–Schuster Rearrangement of Propargylic Alcohols to Complex Enones Using Diaryliodonium Salts. B. S. L. Collins, M. G. Suero, M. J. Gaunt.

• *J. Am. Chem. Soc.* **2013**, 135, 5332. Copper-Catalyzed Electrophilic Carbofunctionalization of Alkynes to Highly Functionalized Tetrasubstituted Alkenes. M. G. Suero, E. D. Bayle, B. S. L. Collins, M. J. Gaunt.

PhD studies

• *Chem. Eur. J.* **2012**, 18, 7287. Enantioselective Multicomponent Synthesis of Fused 6–5 Bicyclic 2-Butenolides by a Cascade Heterobicyclisation Process. M. G. Suero, R. De la Campa, L. Torre-Fernández, S. García-Granda, J. Flórez.

• *Angew. Chem. Int. Ed.* **2010**, 49, 9720. Enantioselective Synthesis of 4-Hydroxy-2-cyclohexenones through a Multicomponent Cyclization. J. Barluenga, M. G. Suero, R. De La Campa, J. Flórez

- *J. Org. Chem.* **2009**, *74*, 7059. On the Mechanism of Cyclization of 5-Hexenylchromate Intermediates in the Reactions of Fischer Carbene Complexes with a Lithium Enolate and Allylmagnesium Bromide. P. Campomanes, J. Flórez, I. Pérez-Sánchez, M. G. Suero, T. L. Sordo, M. I. Menéndez.
- *J. Am. Chem. Soc.* **2008**, *130*, 2708. Diastereoselective Cyclopropanation of Ketone Enols with Fischer Carbene Complexes. J. Barluenga, M. G. Suero, I. Pérez-Sánchez, J. Flórez.
- *Chem. Eur. J.* **2006**, *12*, 7225. Diastereoselective Multicomponent Cyclizations of Fischer Carbene Complexes, Lithium Enolates, and Allylmagnesium Bromide Leading to Highly Substituted Five- and Six-Membered Carbocycles. J. Barluenga, I. Pérez-Sánchez, M. G. Suero; E. Rubio, J. Flórez.

Invited Lectures

2023

- Stockholm University.
- International Conference on Hypervalent Iodine Chemistry, Stockholm.
- New Advances in Carbene Chemistry. ACS San Francisco.
- Athens University, Greece.

2022

- Spanish-Italian Symposium on Organic Chemistry-SISOC-XIII (Tarragona).
- University of Chicago. Zoom platform
- EuChems (Lisbon).
- Universidad Autónoma de Madrid.
- Emerging Technologies and Methodologies (Toledo)

2021

- ESOC 2021 Mini Virtual Symposium (Plenary speaker). (ZOOM platform)
- EPFL. (ZOOM platform)
- Universidad de Zaragoza – CSIC.
- VII Simposio de Jóvenes Investigadores de la SEQT. (ZOOM platform)
- Cinvestav - Centro de Investigación y de Estudios Avanzado, México D.F.

2020

- “3rd International Symposium on Carbene and Nitrene Chemistry” San Antonio, Texas.
- University of California, Irvine.
- Stanford University
- The University of Texas Southwestern, Dallas.
- Instituto de Química Orgánica General-IQOG (Madrid)
- Shanghai Institute of Organic Chemistry-SIOC (Shanghai) *Postpone*
- XXIX International Conference on Organometallic Chemistry -ICOMC 2020 (Shanghai). *Postpone*
- Max-Planck for Coal research (Mulheim) *Postpone*
- ICIQ (ZOOM platform)
- Universität Regensburg (ZOOM platform)
- RWTH Aachen University (ZOOM platform)
- Lilly Madrid (ZOOM platform)

2019

- Ludwig-Maximilians-Universität Munich.
- Universitat de Barcelona.
- Instituto de Investigaciones Científicas de Sevilla.
- CIQUS, Universidad de Santiago.

- Young Investigator Workshop, Vienne.
- Univeristy of Geneve.

2018

- International Conference on Organometallics and Catalysis (ICOC); Goa, India.
- UCB Pharma; Braine-L'Alleud, Belgium.
- Janssen-J&J; Toledo.
- XV Simposio de Jóvenes Investigadores, Toledo, Spain.

2017

- Research Conferences of the Master and PhD Programme UPV/EHU; Bilbao, Spain.
- The University of Tokyo, Graduate School of Pharmaceutical Sciences, Japan.
- 2nd CHAOS Working Group Meeting; Sofia, Bulgaria. CHAOS (C-H bond activation for Organic Synthesis) is a COST Action from the EU.

Other presentations

2020

- Short talk to Master students of Sheffield Hallam University at ICIQ

2019

- Short talk to PhD students of NIOK (Virtual Institute for Catalysis Research in the Netherlands) at ICIQ

2018

- 53rd Bürgenstock Conference; Brunnen, Switzerland. Short talk and poster presentation.
- Gordon Conference Stereochemistry; Salve Regina University, Newport, USA. Poster presentation.

2017

- Spanish-Japanese Symposium on Modern Synthetic Methodology; Gijón. Short talk.
- Gordon Conference Organic Reactions & Processes; Easton, USA. Poster presentation.
- Gregynog Synthesis Workshop; Newtown, Wales. Chalk talk.

2016

- RSQE Biannual Congress in Organic Chemistry; Huelva, Spain. Short talk.

2014

- University of Manchester, School of Chemistry (Invited Lecture)

2013

- Bayer (Berlin, Germany); Invited Lecture
- Syngenta (Stein, Switzerland); Invited Lecture
- Novartis (Basel, Switzerland) ; Invited Lecture
- Jansen-Cilag (Schaffhausen, Switzerland); Invited Lecture
- Astex (Cambridge, UK); Invited Lecture

Patents

- CYCLOPROPENIUM COMPOUNDS, PROCESS FOR THEIR PREPARATION AND USE. EP22382472.3. Inventors: M G Suero (ICIQ), H-F Tu (ICIQ), A Jeandin (ICIQ). Priority date: 17/05/2022. Priority application filed for EPC countries.
- Cyclopropanation reagent and method. EP19382720. Inventors: M G Suero (ICIQ), A G Herraiz (ICIQ). Priority date: 22/08/2019. Priority application filed for EPC countries.
- Diazomethylation reagent and process for using it. US16/482,966, Inventors: M G Suero (ICIQ), Z Wang (ICIQ). Priority date: 09/02/2017. Granted in US, Spain, UK, Germany, Switzerland.

Research projects and grants

The track record of research funding as Principal Investigator is above 4 million €

- New carbyne transfer catalysis. **PhD fellowships FI-AGAUR, Generalitat de Catalunya**. March 2022 – February 2025. Principal Investigator.
Budget: 69.169€
- Next-generation chemical synthesis by means of supramolecular catalysis (GA 801474, CEX2019-000925-S MCIN/AEI//10.13039/ 501100011033). **MSCA-COFUND I2:ICIQ Impulsion**, European Commission, Ministerio de Ciencia e Innovación – Agencia Estatal de Investigación January 2022 – December 2023. Principal Investigator.
Budget: 119.400€
- New catalytic strategies for chemical synthesis. Innovative catalysis for sustainable chemical processes (CEX2019-000925-S MCIN/AEI//10.13039/ 501100011033). **FPI-SO fellowships**, Ministerio de Ciencia e Innovación – Agencia Estatal de Investigación January 2022 – December 2023. Principal Investigator.
Budget: 99.260€
- Site-Selective Protein Functionalization. **ICIQ-Severo Ochoa Strategic Funds Call**. December 2021 – November 2023. Principal Investigator.
Budget: 50.000€
- Late-stage diazomethylations to impact urgent & unmet medical needs (Late-Need) **Proyectos Prueba de Concepto 2021** Ministerio de Ciencia e Innovación – Agencia Estatal de Investigación. December 2021 – November 2023. Principal Investigator.
Budget: 109.250€
- Carbyne transfer catalysis for C(sp²)–C(sp²) bond (radio)fluorinations (101028657). **H2020-MSCA-IF**, European Commission. August 2021 – July 2023. Principal Investigator.
Budget: 172.933€.
- Late-stage C–H bond construction of cyclopropanes to impact drug discovery (101032589). **H2020-MSCA-IF**, European Commission. May 2021 – February 2023. Principal Investigator.
Budget: 160.933€.
- New carbon reactivity rules for molecular editing (865554). **ERC Consolidator Grant 2019**, European Commission. September 2020 – August 2025. Principal Investigator.
Budget: 2.000.000€.
- New carbyne transfer catalysis in organic chemistry (PID2019-104101GB-I00). **Proyectos I+D+i**, Ministerio de Ciencia e Innovación – Agencia Estatal de Investigación. June 2020 – May 2023. Principal Investigator.
Budget: 145.200€. This project was awarded with a FPI fellowship, Budget: 96860€.
- Nuevas reglas de reactividad de carbono (EUR2019-103814). **Acciones de Dinamización «Europa Excelencia» 2019**. MICIU. Agencia Estatal de Investigación. October 2019 – October 2020. Principal Investigator.

Budget: 75.000€.

- Síntesis de nuevos derivados antimaláricos a través de una nueva reacción de borilación. **Becas Leonardo a Investigadores y Creadores Culturales 2019**. Fundación BBVA. October 2019 – March 2021. Principal Investigator.

Budget: 40.000€.

- Photocatalytic C-H Bond CF₃-diazomethylation (794815). **H2020-MSCA-IF**, European Commission. March 2018 – February 2020. Principal Investigator.

Budget: 170.121€.

- Nuevos conceptos para la activación asimétrica de pequeñas moléculas a través de catálisis fotoredox y metálica (CTQ2016-75311-P). **Proyectos I+D+I**, MINECO, FEDER. December 2016 – December 2019. Principal Investigator.

Budget: 84.700€. This project was awarded with a FPI fellowship (BES -2017-080163). Budget: 92.750€.

- Nuevas estrategias catalíticas de funcionalización C-H para síntesis química (EUI2015-62710). **Acciones de Dinamización «Europa Investigación» 2015**. MINECO. June 2015 – May 2016. Principal Investigator.

Budget: 4.100 €.

- New catalytic concepts for chemical synthesis: Enantioselective β -Functionalization of Enals via Cooperative Photoredox and N-Heterocyclic Carbene Catalysis (ICIQ- IPMP). European Commission (**MSC-COFUND programme**) & MINECO (SEVERO OCHOA Programme). October 2015 – April 2019. Principal Investigator.

Budget: 125.831€.

- New catalytic C-H functionalization strategies for chemical synthesis. **ICIQ Starting Career Programme**. October 2014 – June 2020. Principal Investigator.

Budget: 739.496€.

Donations

2017 2000€ from **Agilent Technologies** to cover the cost of a video directed to the general public to explain the results of our Nature article. Dr Suero help in the preparation of the script with Scienseed, in collaboration with Dr Fernando Gomollón (Fomer ICIQ Science Communicator). <https://youtu.be/y7TIZ8GR6PA> (Language: English, Subtitles: English, Catalán, Asturianu, Castellano, Chinese)

Supervision of Students and Postdoctoral Fellows at ICIQ

Below is the list of PhD thesis supervised and on-going

Ana García Herraiz. ICIQ Fellowship, 1 October 2015 - 20 September 2019 (defence date), Examining committee: Profs. Ben Feringa, Antonio Echavarren, Phillipe Renaud.
Thesis title: *New Carbon Reactivity Rules with Radical Carbenoids and Carbyne Equivalentents Enabled by Photoredox Catalysis (Cum Laude)*.

Publications: *Angew. Chem., Intl. Ed.* **2017**, 56 (6), 1610-1613; *Nature* **2018**, 554, 86-91; *Chem. Sci.* **2019**, 10, 9374-9379.

Prizes: **Pioner Award 2019** (CERCA); **REAXYS PhD Prize** (Finalist & poster prize) 2019; **RSEQ-Eli**

Lilly Award, 2019; **REAXYS-RSEQ Early Researcher Award** (1st position), 2018.

Eric Cots. ICIQ Fellowship, 1 October 2017 - 17 december 2021 (defence date), Co-supervisor: Kilian Muñoz. Examining committee: Prof. Miquel A. Pericàs, Prof. Mercedes Amat, Alexandr Shafir. Thesis title: *Understanding Iodine (I/III) Catalysis: From Racemic to Enantioselective Transformations (Cum Laude)*. Publications: *Adv. Synth. Catal.* **2019**, *361*, 2-25; *ChemSusChem* **2019**, *12*, 3028-3031.

Pau Sarró Grané, FPI fellowship (BES- 2017-080163), 2 October 2017 - 26 April 2022 (defence date). Examining committee: Profs. Adelina Vallribera, Ruben Martin, Martín Fañanás-Mastral. Thesis title: *The discovery and development of a Rh-catalyzed carbyne transfer platform for the skeletal modification of C(sp²)-C(sp²) bonds (Cum Laude)*. Publications: *J. Am. Chem. Soc.* **2019**, *141*, 15509–15514; *Chem. Sci.* **2022**, *13*, 4327-4333

On going:

Aliénor Jeandin, ICIQ fellowship, 16 September 2019 – 2023. Thesis title: New catalytic synthesis of cyclopropenium cations and applications. Publications: *J. Am. Chem. Soc.* **2022**, *144*, 37, 16737–16743

Eric Palomo Martínez, FPI fellowship (PRE2020-092989), 15 October 2020 – 2024. Thesis title: New catalytic generation of Fischer-type Rh-carbenes. Publications: *J. Am. Chem. Soc.* **2023**, accepted manuscript

Josep Esteve Guash, ICIQ PhD fellowship, 02 November 2021 – 2025. Thesis title: Discovery and development of an enantioselective carbyne transfer platform.

Valero Gimeno Alfonso, AGAUR-FI fellowship (2022 FI_B 00540), 04 October 2021 – 2025. Thesis title: New catalytic C–C bonds functionalizations.

Alessio Puggioli, FPI-SO fellowship (PRE2021-097799), Co-supervisor: Feliu Maseras, 11 October 2021 – 2025. Thesis title: New hypervalent iodine reagents for chemical synthesis

Quan Zhang, ICIQ PhD fellowship, 23 January 2023 – 2027. Natural product synthesis by a carbyne transfer platform

Guillaume Mollaert, ICIQ PhD fellowship, 5 September 2022 – 2026. Enantioselective carbyne transfer and development of a new aromatic ring synthesis.

Scientific and professional development of PhD students:

Pau Sarró Grané. He founded JOYCE BEER CO., an artisan brewery in Catalonia.

Ana García Herraiz. After performing postdoctoral research with Nicolai Cramer (EPFL), she joined Firmenich as Principal Scientist

Eric Cots. Currently applying for jobs in the chemical industry in Catalonia.

Current postdoctoral researchers:

Dr. Adriana Faraone, ICIQ-Severo Ochoa fellowship (PhD from ICIQ). Ref. IC-ISFC-2021-MGS

Dr. Hangfei Tu, Marie S. Curie fellowship GA 101028657 (PhD from SIOC, China)

Dr. Wei Jie Teo, Marie S. Curie fellowship GA 101032589 (PhD from Singapore University)

Dr. Karen de La Vega, Marie S. Curie COFUND fellowship (PhD from Sorbonne Université) GA 801474

Dr. Qiyuan He, ICIQ postdoctoral fellowship (PhD from Osaka University)

Dr. Bowen Li, ICIQ postdoctoral fellowship (PhD from Shanghai Jiao Tong University)

Former postdoctoral researchers:

Dr Zhaofeng Wang (associate professor in Hunan Univeristy, China), Dr Ana M^a del Hoyo (profesora de secundaria, Madrid), Dr. Elham Etema (senior scientist at BioDuro-Sundia, San Diego, US), Dr Liyin Jiang (associate professor in Chengdu Univeristy, China), Dr Eric Cots (job seeker), Dr Leonardo Nannini

(Operations Chemist, Lonza; Switzerland), Marten L. Ploeger (postdoctoral stay with Prof Hermans, Strasburg University).

Undergraduate summer fellows sponsored by La Caixa: Ana Escobar (2015), Melanie Armstrong (2016), Eduardo da Concepción (2017), Marta Spasic (2018), Pol Mestres (2019), Tran Thi Huyen Trinh (2022)

Visiting PhD students: Yuan Yuchao (2017).

Master Students: Norman Diaz (2022-2023), Hafssa el Khannaji (2021-2022).

Bachelor Thesis: Norman Diaz (2022).

Prácticas de laboratorio: Norman Diaz (2021), Hafssa el Khannaji (2020).

Fellowships as postdoctoral researcher and PhD student

2010 – 2012	Marie Curie Intra-European Postdoctoral Fellowship – IEF (REA). Chemistry Department, University of Cambridge. Grant Agreement Number: PIEF-GA-2009-253650
2004 – 2008	Predocdoctoral fellowship, FPU (Spanish Ministry of Education). Facultad de Química, Universidad de Oviedo
2003 – 2004	Collaboration fellowship (Spanish Ministry of Education). Facultad de Química, Universidad de Oviedo

Teaching Experience

from 2020	Master in Synthesis, Catalysis and Molecular Design, Course in Organometallic Chemistry and Homogeneous Catalysis. Universitat Rovira i Virgili-ICIQ (Spain). 21 h/year.
2017-2019	Master in Synthesis, Catalysis and Molecular Design, Course in Asymmetric Synthesis. Universitat Rovira i Virgili-ICIQ (Spain). 21 h/year.
2010 – 2012	Marie Curie Postdoctoral Fellow – The Foundations in Organic Synthesis, New Synthetic Methods, Stereoselective Synthesis. University of Cambridge, (UK). 27 h.

Activity as reviewer

JOURNALS Science, Nature, Nature Chemistry, Chem-Cell, Angewandte Chemie, Journal of the American Chemical Society, Chemical Science, Chemical Communications, Organic Letters, Journal of Organic Chemistry, Beilstein Journal of Organic Chemistry, Helvetica Chimica Acta, Frontiers in Organic Chemistry.

GRANTS AND FELLOWSHIPS

Agencia Estatal de Investigación. Ministerio de Ciencia e Innovación.

- Programa Estatal Proyectos de I+D de Generación de Conocimiento.
- Ayudas para contratos Juan de la Cierva-formación.

SNF Switzerland

Activity as scientific consultant

UCB Pharma, Belgium, 2018.

Collaborations

Janssen-Cilag (Dr Alejandro Dieguez, Toledo), Novartis (Dr Fabio Lima, Basel), AiCuris (Dr Helmut Buchman, Germany)

Prof. Feliu Maseras (ICIQ), Prof. Jordi Llop (CICBiomagune).

Institutional responsibilities

2022 Founder and Evaluation Committee member of the UCB Lecture Award.

2022 Member of the Evaluation Committee member for the ICIQ Starting Career Programme

2020-2021 Responsible at ICIQ for developing a partnership with IRB Barcelona to develop a joined drug discovery programme.

From 2019 Committee member at ICIQ for the Implementation of OTM-R in recruitment and selection processes.

From 2020 BIST Strategic Plan 2021-2025. Acting as ICIQ representative in the working group of BIST in the area of Health

2015-2019 ICIQ Health and Safety Committee

2015-2017 Group Leader representative in the ICIQ'S SOCIAL INVOLVEMENT COMMITTEE. Working group that has successfully achieved the "HR Excellence in Research Award".

From 2015 Member of the Master Thesis Examining Committee of the ICIQ-URV Master in Synthesis, Catalysis and Molecular Design.

Member of the Thesis Examining Committee of Sergio Sopena de Frutos (ICIQ, 2018), Yangyang Shen (ICIQ, 2018), Luca Buzzetti (ICIQ, 2018), Marino Ronaldo Börjesson (ICIQ, 2020), Miguel Claros (ICIQ, 2020), Marco Mastandrea (ICIQ, 2020), Daniele Mazzeola (ICIQ, 2020), Shang-Zheng Sun (ICIQ, 2020), Joan Guillem Mayans (ICIQ, 2021), Alberto Garrido Castro (Universidad Autónoma de Madrid, 2021), Guillaume Pisella (EPFL, 2021), Qingqing Sun (ICIQ, 2021), Elena Detta (ICIQ, 2021), Craig Day (ICIQ, 2022), Ester Maria Di Tommaso (Stockholm University, 2023)

Organization of scientific meetings

2023

ICIQ School, Co-organizer with Prof. Ruben Martín.

2018

Chairman of the [ICIQ-BASF seminar programme](#).

2018

Local organizer for the Cost Action CHAOS (C-H Activation in Organic Synthesis), Tarragona-ICIQ. September 19-21

Member of International Scientific Advisory Boards

2024

Conference in advances in photoredox catalysis and photochemistry, Padova.

Outreach activities

2023

Lecture to high-school students at ICIQ within the programme "Bojos por la Química" to be presented

2022

Lecture to high-school students at ICIQ within the programme "Bojos por la Química"

2021

Lecture to high-school students at ICIQ within the programme “Bojos por la Química”

2020

- Interview published made to the PI in ARA (Cataluña) explaining the aims of the 2019 ERC Consolidator grant CARBYNE.

2019

- Interview published made to the PI explaining the aims of the 2019 ERC Consolidator grant CARBYNE:

La Nueva España (Asturias), El Comercio (Asturias).

- Interview in La Cadena Ser (Tarragona)

2018

- Carbynes – The new piece of chemistry's Lego. This video explains our Nature paper to the general public
- Lecture to high-school students at ICIQ within the programme “Bojos por la Química”

Other information

- Professional member of RSQE, ACS-Division of Organic Chemistry.
- Member of the COST Action for C-H Activation in Organic Synthesis (CHAOS)