# Prof. Katherine Villa

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URL for websites: https://iciq.org/research-group/prof-katherine-villa/overview/
https://cientificasinnovadoras.fecyt.es/cientificas/katherine-villa
https://academiajoven.es/academicos/academicos-academicos/katherine-villa-gomez/

## RESEARCH SUMMARY

47 research papers and 1 patent | h-index: 28 (Google Scholar) | + 2920 citations (Google scholar) | +3.2 Mi€ Attracted as PI | 4 cover images, + 50 news outlets | + 30 Keynote/Invited talks

I am leading the "Advanced Photocatalytic Materials for Energy and Environmental Applications" group, established at ICIQ in 2021. Our research lies at the intersection of chemistry, nanotechnology, and sustainability, focusing on designing nanostructured photocatalytic systems and light-driven micro/nanomotors to tackle global challenges in energy, environmental and microbial resistance. We aim to convert pollutants like $CO_2$ into valuable fuels through advanced material heterojunctions and to design bio-inspired, photo-rechargeable nanoswimmers for applications in water purification, sensing, and photodynamic therapy. The group comprises highly international and multidisciplinary members, including 4 postdoctoral researchers, 5 PhD students, 1 visiting PhD student, 2 master students, and 1 technician. Many team members have secured prestigious fellowships, such as MSCA-PF, Juan de la Cierva, Beatriu de Pinós, FPI, FI Joan Oró, and MMRES BIST, reflecting the supportive environment within the group that fosters individual growth and collective efforts dedicated to creating impactful solutions for a greener and healthier future.

## INTERNATIONAL MOBILITY


I have built a multidisciplinary research career enriched by extensive international mobility across **prestigious institutions** in **Colombia, Spain, Portugal, France, Belgium,** and the **Czech Republic**. After earning my bachelor's in chemistry at the University of Quindio (**Colombia**) and completing a PhD at the Autonomous University of Barcelona with a PIF fellowship, I held postdoctoral positions at IREC and IBEC in Catalonia, where I worked on developing photocatalytic materials for renewable energy and self-propelled chemical micromotors for water cleaning, respectively. Throughout my career, I have worked at prestigious institutions across Europe as a visiting scholar, including Instituto Superior Técnico **(Portugal**), CEA Grenoble (**France**), and Ghent University (**Belgium**). I further expanded my international experience at the Advanced Functional Nanorobots Center, University of Chemistry and Technology, Prague (**Czech Republic**), where I worked for three years as Senior Scientist, before returning to Spain as a group leader at ICIQ. Over these research experiences, I have **mentored/supervised undergraduate (9), master (6), PhD students (2) and postdocs (5)** in the fields of energy, (photo-)catalysis and micro/nanomotors. Some of them are now pursuing doctoral studies, moved to the pharmaceutical industries and/or being appointed as assistant professors.

## EDUCATION

2013 **PhD in Chemistry (Graded Excellent Cum Laude distinction).** Chemistry Department, Universitat Autònoma de Barcelona (UAB), Spain. PhD Supervisor: José Peral Pérez.

2011 **Master's in Science and Chemical Technology.** Chemistry Department, UAB, Spain.

2008 **BSc in Chemistry.** Universidad del Quindío, Colombia.

## CURRENT POSITION

Oct. 2024 **Senior Group Leader** and **Head** of the "Advanced Photocatalytic Materials for Energy and Environmental Remediation" group at the Institute of Chemical Research of Catalonia, Spain.

## PROFESIONAL SCIENTIFIC EXPERIENCE

| Period | Institution | Position | City, Country |
|---|---|---|---|
| 2021-2023 | Institute of Chemical Research of Catalonia (ICIQ) | Principal Investigator,PI<br>"la Caixa" Junior Leader<br>(Mentor: José Ramón Galán-Mascarós),<br>Ramón y Cajal fellow | Tarragona, Spain |
| 2022 | Ghent University | Visiting Researcher<br>(Host advisor: Philippe Smet) | Ghent, Belgium |
| 2018-2020 | University of Chemistry and Technology (UCT), Prague. | Senior Scientist<br>(Mentors: Martin Pumera and Zdenek Sofer) | Prague,<br>Czech Republic |
| 2017-2018 | Institute for Bioengineering of Catalonia (IBEC) | Postdoctoral Researcher<br>(Mentor: Samuel Sánchez) | Barcelona, Spain |
| 2016-2017 | Career break: Maternity leave (12 months) | | |
| 2013-2016 | Catalonia Institute for Energy Research (IREC) | Postdoctoral Researcher<br>(Mentors: Joan R. Morante and Teresa Andreu) | Barcelona, Spain |
| 2015 | University of Lisbon | Visiting Researcher<br>(Host collaborator: Carlos Henriques) | Lisbon, Portugal |
| 2014 | French Alternative Energies and Atomic Energy Commission (CEA) | Visiting Researcher<br>(Host collaborator: Laurent Bedel) | Grenoble, France |
| 2009-2013 | Autonomous University of Barcelona (UAB) | Predoctoral Researcher<br>(Supervisor: José Peral Perez) | Bellaterra, Spain |
| 2012 | Platform Solar of Almeria | Visiting Researcher<br>(Host supervisor: Ignacio Maldonado) | Almeria, Spain |
| 2008-2009 | Universidad del Quindío (UQ) | Co-Principal Investigator | Armenia, Colombia |

## AWARDS AND RECOGNITIONS

2025 ***Early Career Editorial board*** of Nano Letters (ACS), Impact Factor: 9.6.

2025 ***Consolidación Investigadora*** by the Spanish Ministry of Science and Innovation.

2024 ***EuChemS Lecture award*** by European Chemical society.

2024 Selected as one of the **top 5 finalists** for the prestigious "**Princess of Girona Investigator Award"** Success rate: 6%.

2024 Selected as ***"Rising Stars"*** series by *Advanced Optical Materials* and "***Women in Nanoscience***" by *Nanoscale*.

2023 ***Leonardo grant in Basic Sciences*** by BBVA foundation. Success rate: 4.6%

2023 Selected member ***Young Academy of Spain***. Success rate: 10%.

2023 ***Young researcher award***, group leader modality, by Royal Spanish Society of Chemistry.

2023 ***Early Career Editorial board*** of Applied Catalysis B: Environmental (Elsevier). Impact Factor: 20.3.

2022 Recognized as ***Cientificas e Innovadoras*** by FECYT/Spanish government.

2022 ***ERC-StG Grantee.*** European Research Council. Success rate: 10%.

2022 ***Ramón y Cajal Grant-Tenure track- Senior category.*** Spanish Ministry. Success rate: 16%.

2022 ***Women in Nanoscience award***. In recognition of exemplary work in the Nanoscience field by Global Conference on Nanotechnology

2022 ***Mother of Science Award*** by BIST. Recognition of successful scientific mothers.

2021 ***la Caixa Junior Leader fellowship*, Incoming modality**. Highly competitive fellowship aimed to attract excellent researchers to develop their own research projects in Spain. Success rate: 10 %.

2020 ***Beatriu de Pinós fellowship***. AGAUR. Success rate: ~20%.

2020 ***MSCA-Seal-of-Excellence fellowship***. European Comission. Success rate: ~20%.

## PROJECTS GRANTED AS PRINCIPAL INVESTIGATOR (PI)

| Call name | Title / Reference | Funding Agency | Dates | Amount (€) |
|---|---|---|---|---|
| Consolidación Investigadora | Steerable photoactive micromotors, based on metal complexes, by structured light / CNS2024-154696 | Spanish Ministry of Science and Innovation | 01/04/2025 – 31/03/2027 | 199,080 |
| BIST IGNITE 6th Edition collaborative project 2023 | Real-Time Tracking of the Photophysics and Photocatalytic Performance of Nanoscale Swimmers | BIST/ Barcelona Ajuntament | 01/11/2024 – 31/06/2024 | 20,000 |
| Leonardo BBVA Grant 2023 | Optical rechargeable Nanorobots for Fungal Biofilm Eradication / RobotsFun | BBVA foundation | 01/10/2023 – 31/03/2025 | 40,000 |
| Proyectos de Generación de Conocimiento 2023 | Photoactive microswimmers for selective catching, detection, and removal of emerging pollutants / PID2022-136886OA-I00 | Spanish Ministry of Science and Innovation | 01/10/2023 – 31/10/2026 | 137,500 |
| **ERC Starting Grant 2022** | **Engineering of Photo-rechargeable Nanoswimmers using Multicomponent Heterojunctions / 101076680** | **European Research Council** | **01/05/2023 – 30/04/2028** | **1,500,000** |
| Ramón y Cajal 2022 | Advanced photocatalytic materials for energy and environmental applications / RYC2021-031075-I | Spanish Ministry of Science and Innovation | 01/01/2023 – 31/12/2027 | 236,300 |
| la Caixa Junior Leader | One-Dimensional Nanostructured Catalytic Systems for the Gas-Phase Photocatalytic Conversion of Carbon Dioxide / LCF/BQ/PI21/11830017 | La Caixa Foundation / European Comission | 01/06/2021 – 31/12/2022 | 305,000 |
| Beatriu de Pinós-MSCA-Co-fund fellowship | 3D-printed photocatalysts for the photoconversion of microplastics into valuable products / 2019BP00119 | AGAUR / European Commission | 3 years *(Declined)* | 144,300 |
| H2020-MSCA-IF-Seal-of-Excellence fellowship | Photoreforming of Microplastics by Light Activated Artificial Sponges / 892657 | University of Padova | 2 years *(Declined)* | 100,000 |
| Proyectos de Investigación | Photocatalytic degradation of organic pollutants in wastewater by metal doped $TiO_2$ films / 421 (Co-PI) | Colciencias, Colombia | 1 year | 12,000 |
| PROJECTS GRANTED AS HOST SUPERVISOR | | | | |
| Beatriu de Pinós | Multiplex Excited State Photoredox Colloidal Motors / 2023BP00230 (Fellow: Majid Basharat) | AGAUR | 01/02/2025 – 31/01/2028 | 137,423 |

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|---|---|---|---|---|
| Juan de la Cierva Fellowship 2023 | Photocatalytic nanomotors with NIR response / JDC2023-051508-I (Fellow: Yufen Chen) | Spanish Ministry of Science and Innovation/ MCIU | 01/12/2024 – 11/30/2026 | 72,000 |
| HORIZON-MSCA-2023-PF-01 | Development of Advanced Thermometric Nanomotors / 101148668 (Fellow: Joao Gonçalves) | European Commission | 17/07/2024 – 16/07/2026 | 181,152 |
| FPI-fellowship 2024 associated with our project PID2022-136886OA-I00 | Photoactive microswimmers for selective catching, detection, and removal of emerging pollutants (PhD student: Viktoria Lovász) | Spanish Ministry of Science and Innovation | 01/01/2024 – 31/12/2028 | 111,758 |
| Juan de la Cierva Fellowship 2022 | Photocatalytic $CO_2$ reduction/ FJC2021-047222-I (Fellow: Xiaojiao Yuan) | Spanish Ministry of Science and Innovation | 01/01/2023 – 12/31/2024 | 64,800 |
| | | | **Total** | **3,261,313** |

## TECHNOLOGY TRANSFER

**Patent:** Portable multistage device for micromotors-assisted water treatment for organic, heavy metal, and microorganisms'removal. **Inventors:** J. Parmar, D. Vilela, **K. Villa**, S. Sánchez. Application number: EP18382526A (15/01/2018), WO2020011995A1 (16/01/2020).
Holding Institution: IBEC/ICREA. Priority country: Spain. Date: 15/01/2018.

**Market and patentability studies**: 3D-printed photocatalytic systems for $H_2$ generation by *Bridge the Gap*, *Albirem* and Arvor consulting agencies. Financed by the $H_2$ network of Catalonia (H2CAT). Amount: 6K€.

**Prototyping and Commissioning of Photocatalytic Reactors:** - Commissioning tests of a solar pilot plant reactor (pre-commercial production system) in collaboration with the **Solar Platform of Almeria (PSA)**. Achieved the first demonstration of hydrogen generation from direct solar light and sewage water, reaching energy efficiencies of 2.5%.
- Developed a photocatalytic reactor equipped with a 2kW lamp in collaboration with a market leader company (**Enviolet, Germany**) for $CH_4$ oxidation. Performed commissioning tests at **IREC** and **CEA (Grenoble, France)** to validate the catalytic efficiency of this technology at large-scale.

## SUPERVISION AND MENTORING OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

### Ongoing supervision of PhD students:

**Neus Munar Barceló.** Position covered by FI Joan Oró fellowship. Defense: Expected September 2028.
Thesis title: 3D-printed photocatalysts for solar fuel generation (Main supervisor).

**Anthony Martinez**. Position covered by ERC-StG PhotoSwim project. Defense: Expected February 2028.
Thesis title: Photoactive nanorobots in confinement (Main supervisor).

**Viktória Lovász.** FPI fellowship associated with the project (PID2022-136886OA-I00). Defense: Expected October 2028.
Thesis title: Photoactive nanomotors for the selective catching and detection of aqueous pollutants (Main supervisor).

**Rebeca Ferrer**. Position covered by ICIQ fellowship. Defense: Expected October 2026.
Thesis title: Development of photocatalytic microswimmers for energy and environmental remediation. (Main supervisor).
*Current research outcome: Small 2024, 21, 2410901, ACS Appl. Mater. Interfaces 2024, 16, 30077. Small 2023, 19, 2370136, and Nanoscale 2023, 15, 15785-15793.*

**Neus Sunyer i Pons.** FPU Fellowship associated with project RTI2018-095618-B-I00. Defense: Expected April 2025
Thesis title: Mg-based catalysts for the electrocatalytic $CO_2$ reduction reaction. (Co-supervisor).
*Current research outcome: ChemSusChem, 2023, 16, e202202228 and Appl. Catal. A, 2025, 690, 120050.*

**Marcos Augusto R. da Silva.** Position covered by FAPESP scholarship (Brazil). Visiting PhD student (1 year).
Topic: Single atoms coordinated on carbon nitrides for selective methane photocatalytic oxidation to valuable products. (Main supervisor at ICIQ).

### Ongoing supervision of master students:

**Angie Johana Bolaños Burbano.** Position covered by IVORI Fellowship. Defense: Expected July 2025.
Thesis title: Encapsulation of photoactive nanomotors in polymeric containers (Main supervisor).

**Luisa Natalia Cordoba Urresti.** Position covered by IVORI Fellowship. Defense: Expected July 2025.
Thesis title: Metal-doping of light-driven nanomotors (Main supervisor).

### Ongoing supervision of postdoctoral researchers:

**Dr. Yufen Chen.** Position initially covered by ERC-StG *PhotoSwim* project; currently supported by a Juan de la Cierva fellowship (since December 2024).
*Research project:* Development of heterostructured optical micro/nanomotors.
*Current research outcome: Small 2024, 21, 2410901, and ACS Appl. Mater. Interfaces 2024, 16, 30077.*

**Dr. Joao Gonçalves**. Position initially covered by ERC-StG *PhotoSwim* project; currently supported by a MSCA-PF fellowship (since July 2024).
*Research project:* Development of thermometric nanomotors with dual-engine configuration.
*Current research outcome: Small 2024, 21, 2410901.*

**Dr. Majid Basharat.** Position initially covered by ERC-StG *PhotoSwim* project; currently supported by a Beatriu de Pinós fellowship (since February 2025).
*Research project*: Design of light-driven polymeric micro/nanomotors.

**Dr. Flavia Amanda Pedroso de Morais.** Position covered by ERC-StG PhotoSwim project since 13th January 2025.
*Research project*: Light-driven nanomotors for photodynamic therapy.

### ***Past mentored/supervised undergraduate, master students, and postdocs.***

### Supervised undergraduate students:

**Bridget Allan**. 2024 Summer Fellow-ICIQ, currently pursuing a Bachelor of Science at Massachusetts Institute of Technology, Cambridge, USA.
**Anastasiya Syurzhyk**. 2024 Premi Extraordinari de Batxillerat_ACER fellow at ICIQ.
**Pau Prieto**. 2024 Joves i Ciència la Pedrera fellow.
**Melanie Cerdeño**. 2023 Summer Fellow-ICIQ, currently pursuing a bachelor's in chemistry at Yachay Tech University in Ecuador.
**Sean Cardiff**. 2022 Summer fellow-ICIQ, currently pursuing a PhD at Dept. of Chemical Engineering & Biotechnology, University of Cambridge, UK.
**Ramón Gil** and **Paula Gómez**. 2022-2023 Joves i Ciència la Pedrera fellows at ICIQ.
**Liliana Osorio** and **Adrian Felipe Bedoya**. 2006-2009, Universidad del Quindío, Colombia, currently working as postdoctoral fellows at *Instituto de Ciencias Aplicadas y Tecnología UNAM* (México).

### Supervised master students:

**Neus Munar Barceló**. 2023 MMRS BIST fellow.
Thesis title: Photoreforming of microplastics by 3D-printed photocatalysts (Main supervisor). Defended in July 2024. Currently, she is pursuing a PhD in our group (ICIQ).

**Andrés C. Muñoz**. 2022 master ICIQ fellow.
Thesis title: Surface-modified photoactive microswimmers for selective organic reactions (Main supervisor). Defended in July 2023. Currently, pursuing his doctoral studies at New Mexico State University, USA.

**Nurdana Orynbek.** 2023, visiting researcher at ICIQ, covered by Erasmus Master from Université Paris-Saclay. Project title: Supramolecular approaches for light-driven micromotors.

**Pol Torres Vila**. 2021. Co-supervised master student BIST (MMRES).
Project title: Photoelectrocatalytic oxygen evolution by nanostructured bismuth vanadate-based heterojunctions. Currently, he is pursuing doctoral studies at École Polytechnique Fédérale de Lausanne (Switzerland).

**Ashley Black Serra** and **Eleonora Obón Estrada**. 2010-2012, Master students at UAB.
Project title: Synthesis/characterization of materials for the photocatalytic hydrogen generation, currently working as a postdoc at ICMAB-CSIC and technician at Thor Especialidades, S.A, respectively.

**Mentored PhD students:**
**Petr Salek**. 2018-2020, UCT-Prague, currently working in the chemical industry in the Czech Republic.
**Jemish Parmar**. 2017-2018, IBEC, currently working as Project Manager in Ideaded SL (Spain).

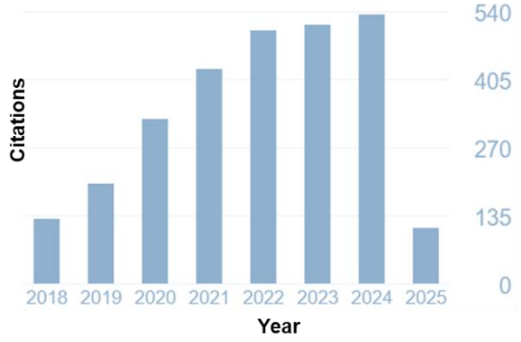
**Postdoctoral researchers:**
**Dr. Xiaojiao Juan.** Postdoc 2021-2023, who worked on the development of photocatalytic materials for $CO_2$ conversion. (Main Supervisor). Position firstly covered by la Caixa Foundation and later with a JdC fellowship (FJC2021-047222-I). Currently, she is a MSCA fellow at ICIQ.
*Research outcome:* *Adv. Opt. Mater. 2024, 2303137, ChemSusChem, 2023, 16, e202202228,* and *Small 2023, 19, 2370136.*

**Dr. Juan Gurruchaga.** Visiting postdoc 2024 from Cic biomaGUNE, who worked on the design of artificial proteins for methane oxidation.

**Dr. Yaroslav Kochergin.** 2018-2020, UCT, Prague Czech Republic. He is currently working as R&D Project Manager at Ranido (Czech Republic).
**Dr. Yulong Ying.** 2018-2020, UCT, Prague Czech Republic. He is currently working as an assistant professor at Zhejiang Sci-Tech University (China).
**Dr. Amir M. Pourrahimi.** 2018-2020, UCT, Prague Czech Republic. He is currently working as Consultant in Chemistry & Materials at NKT HV Cables AB (Sweden).
Research outcome: these mentoring activities at UCT led to several publications in top-leading journals: 1x *ACS Nano* 2021, and 2x *Adv. Funct. Mater.* 2019 and 2020, 1x *Small Methods*, 2019, and 1x *ACS Appl. Mater. Interfaces*, 2018.

## PUBLICATIONS IN INTERNATIONAL PEER REVIEWED JOURNALS

**Total publications:** 47. (**93% in Q1**) in top international peer-reviewed journals, such as *ACS Nano, JACS, Adv. Funct. Mater., Chem. Soc. Rev,* and *Small*.
**h-index:** 28 (i-index:34, Google Scholar). **Total citations:** 2927 (Google scholar, 02/03/2025).
**Average number of citations per publication:** 69.3 (Web of Science). The growing impact of my research is reflected in the steady increase in worldwide citations (see figures below; sources: Google Scholar and Web of Science).
**Research highlights:** Featured in journal cover images and prominent news outlets, including *Nature Outlook, Advanced Science news, C&En News, Phys.org, Wikipedia*, national TV appearances (*Česká televise* and *TAC 12*) and radio broadcasts, such as podcasts *Blau de Prússia* and *Ciencia al Alba*, along with highlights in radio Cambrils, Tarragona radio, *Arran de Mar*, among others.





**List of publications by year (* Corresponding author)**

**2025**

**47)** S. Chen, D. Fan, P. Fischer, A. Ghosh, K. Göpfrich, R. Golestanian. H. Hess, X. Ma, B. Nelson, T. Patiño, J.Tang, **K. Villa**, W. Wang ,L. Zhang, A. Sen, S. Sánchez. Nanomotors: 20 years anniversary and future roadmap. *ChemRxiv.* 2025; doi:10.26434/chemrxiv-2025-lczw9. ***Invited to Nature Nanotechnology*** (Under revision).

**46)** N. Sunyer-Pons, V. Mazanek, Z. Sofer, B. Khezri, **K. Villa**, J. R. Galan-Mascaros*. Exploring Mg-Sn alloys as electrocatalysts for $CO_2$ electroreduction. ***Appl. Catal. A.* 2025**, 690, 120050.

**2024**

**45)** Y. Chen. R. Ferrer-Campos, J. Gonçalves, **K. Villa***. Dual-Energy Integration in Photoresponsive Micro/Nanomotors: From Strategic Design to Biomedical Applications. ***Small* 2024**, 21, 2410901.

**44)** F. Li, T. Li, **K. Villa,** Y. Dong. Micro/nanorobots in nanobiotechnology. ***Frontiers in Bioengineering and Biotechnology*, 2024** 12, 1453307. Guest Editorial.

**43)** P. Jiménez-Calvo, O. Savateev, **K. Villa**, M. J. Muñoz-Batista, K. Domen, Toward Renewable Solar Energy Systems: Advances in Photocatalytic Green Hydrogen Production. ***Global Challenges*, 2024**, 8, 2400122. Guest Editorial.

**42)** R. Ferrer-Campos, A. C. Bakenecker, Y. Chen, M. C. Spadaro, J. Fraire, J. Arbiol, S. Sánchez, and **K. Villa***, Boosting the Efficiency of Photoactive Rod-Shaped Nanomotors via Magnetic Field-Induced Charge Separation. ***ACS Appl. Mater. Interfaces* 2024** 16, 30077-30087. Citations: 3.

**41)** X. Yuan, S. Suárez-García, M. De Corato, A. C. Muñoz, I. Pagonabarraga, D. Ruiz-Molina, **K. Villa***, Self-degradable Photoactive Micromotors for Inactivation of Resistant Bacteria. ***Adv. Optical Mater.* 2024**, 2303137. Citations: 3. Invited article "Rising Stars".
This research article has been selected as cover picture in Adv. Optical Mater 16, 2024, 2470050 and highlighted in 8 News outlet (Adv. Sci. News) and 1 blog.

**40)** S. Heckel, M. Wittmann, M. Reid, **K. Villa***, J. Simmchen*. An account on $BiVO_4$ as photocatalytic active matter. ***Acc. Mater. Res.*** 2024, doi.org/10.1021/accountsmr.3c00021. Citations: 19.

**2023**

**39)** R. Ferrer-Campos, H. Bachimanchi, G. Volpe*, **K. Villa***. Bubble-Propelled Micromotors for Ammonia Generation. ***Nanoscale*** 2023,15, 15785-15793. Citations: 7. Invited article "Special Issue on nanomotors"
This research article has been highlighted in 21 News outlets and 3 blogs and included in the collection "Most accessed articles from 2023 and "Women in Nanoscience" by *Nanoscale*.

**38) K. Villa*.** Exploring innovative designs and heterojunctions in photocatalytic micromotors. ***Chem. Commun*., 2023**, 59, 8375-8383. Citations: 8. Invited Feature Article.

**37)** X. Yuan, N. Sunyer-Pons, A. Terrado, J. L. León, G. Hadziioannou, E. Cloutet, **K. Villa*.** 3D-Printed Organic Conjugated Trimer for Visible-Light-Driven Photocatalytic Applications. ***ChemSusChem*** 2023, e202202228. Citations: 7.

**36)** X. Yuan, R. Ferrer-Campos, F. A. Garcés-Pineda, **K. Villa*.** Molecular Imprinted $BiVO_4$ Microswimmers for Selective Target Recognition and Removal. ***Small*** 2023, 2207303. Citations: 12.
This research article has been selected as Frontispiece in *Small 19, 2370136*.

**2022**

**35)** B. Khezri, **K. Villa*.** Hybrid Photoresponsive/Biocatalytic Micro-and Nanoswimmers. ***Chem. Asian J.* 2022**, 17, e202200596. Citations: 8.

**34)** **K. Villa**, H. Sopha, J. Zelenka, M. Motola, L. Dekanovsky, D. C. Beketova, J. M. Macak, T. Ruml, M. Pumera. Enzyme-Photocatalyst Tandem Microrobot Powered by Urea for Escherichia coli Biofilm Eradication. ***Small* 2022**, 18, 2106612. Citations: 62.
This research article has been highlighted in 2 News outlets, 2 blogs, 5 Reddit threads and included in Wikipedia entry on Microrobotics.

**2021**

**33)** L. Wang, **K. Villa***. Self-propelled micro/nanomotors for removal of insoluble water contaminants: microplastics and oil spills. ***Env. Sci. Nano* 2021**, 8, 3440-3451. Citations: 37.

**32)** Y. S. Kochergin, **K. Villa**, A. Nemeskalova, M. Kuchař, M. Pumera. Hybrid inorganic–organic visible-light-driven microrobots based on donor–acceptor organic polymer for degradation of toxic psychoactive substances. ***ACS nano* 2021**, 15, 18458-18468. Citations: 19.

**31)** **K. Villa*,** J. R. Galán-Mascarós. Nanostructured photocatalysts for the production of methanol from methane and water. ***ChemSusChem* 2021**, 14, 2023-2033. Citations: 25.

**30)** **K. Villa*,** J. R. Galán-Mascarós, N. López, E. Palomares. Photocatalytic water splitting: advantages and challenges. ***Sustain. Energy Fuels* 2021**, 5, 4560-4569. Citations: 107.

**2020**

**29)** **K. Villa**, L. Děkanovský, J. Plutnar, J. Kosina, M. Pumera. Swarming of Perovskite-Like $Bi_2WO_6$ Microrobots Destroy Textile Fibers under Visible Light. ***Adv. Funct. Mater.* 2020**, 30, 200707**.** Citations: 72.
This research article has been highlighted in 2 blogs (*Adv. Sci. News*).

**28)** **K. Villa**, J. Viktorova, J. Plutnar, T. Ruml, L. Hoang, M. Pumera. Chemical Microrobots as Self-Propelled Microbrushes against Dental Biofilm. ***Cell Rep. Phys. Sci.* 2020**, 1, 100181. Citations: 71.
This research article has been highlighted in Nature Outlook: Miniature medical robots step out from sci-fi, March 29, 2022.

**27)** **K. Villa**, J. Vyskočil, Y. Ying, J. Zelenka, M. Pumera. Dual Magnetic/Light-Powered Hybrid Microrobots for Preventing Microbial Contamination in Beer. ***Chem. Eur. J.*, 2020**, 26, 3039-3043. Citations: 35.

**26)** B. Khezri, **K. Villa**, F. Novotný, Z. Sofer, M. Pumera. Smartdust 3D-Printed Graphene-Based Al/Ga Robots for Photocatalytic Degradation of Explosives. ***Small* 2020**, 16, 2002111. Citations: 33.

**25)** Y.S. Kochergin, **K. Villa**, F. Novotný, J. Plutnar, M. J. Bojdys, M. Pumera. Multifunctional Visible-Light Powered Micromotors Based on Semiconducting Sulfur- and Nitrogen-Containing Donor–Acceptor Polymer. ***Adv. Funct. Mater*. 2020**, 2002701**.** Citations: 49.

**2019**

**24)** **K. Villa**, M. Pumera. Fuel-free light-driven micro/nanomachines: artificial active matter mimicking nature. ***Chem. Soc. Rev*., 2019**, 48, 4966-4978. Citations: 220.

**23)** **K. Villa**, F. Novotný, J. Zelenka, M. Browne, T. Ruml, M. Pumera. Visible-Light-Driven Single-Component $BiVO_4$ Micromotors with the Autonomous Ability for Capturing Microorganisms. ***ACS Nano*, 2019**, 13, 8135-8145. Citations: 149.

**22)** A. M. Pourrahimi, **K. Villa**, Z. Sofer, M. Pumera. Light-Driven Sandwich ZnO/$TiO_2$/Pt Janus Micromotors: Schottky Barrier Suppression by Addition of $TiO_2$ Atomic Interface Layers into ZnO/Pt Micromachines Leading to Enhanced Fuel-Free Propulsion. ***Small Methods*, 2019**, 1900258. Citations: 27.
This research article has been selected as cover picture in *Small methods.* 3, 1970035.

**21)** A. M. Pourrahimi, **K. Villa**, C. L. Manzanares Palenzuela, Y. Ying, Z. Sofer, M. Pumera. Catalytic and Light-Driven ZnO/Pt Janus Nano/Micromotors: Switching of Motion Mechanism via Interface Roughness and Defect Tailoring at the Nanoscale. ***Adv. Funct. Mater.*, 2019**, 29, 1808678. Citations: 97.

**2018**

**20)** **K. Villa**, C. L. Manzanares Palenzuela, S. Matejkova, Z. Sofer, M. Pumera. Metal-Free Visible-Light Photoactivated $C_3N_4$ Bubble-Propelled Tubular Micromotors with Inherent Fluorescence and On/Off Capabilities. ***ACS Nano*, 2018**. 12, 12482–12491. Citations: 108.
This research article has been highlighted in the following 3 news outlets, including Chemical & Engineering News (c&en): Metal-free micromotor could clean wastewater. January 10, 2019.

**19)** **K. Villa**, L. Krejčová, F. Novotný, Z. Heger, Z. Sofer, M. Pumera. Cooperative Multifunctional Self-Propelled Paramagnetic Microrobots with Chemical Handles for Cell Manipulation and Drug Delivery. ***Adv. Funct. Mater.* 2018**, 28, 1804343. Citations: 127.
This research article has been selected as inside back cover picture. Adv. Funct. Mater. 28, 1870311**.**

**18)** **K. Villa**, J. Parmar, D. Vilela, S. Sanchez. Metal-oxide based microjets for the simultaneous removal of organic pollutants and heavy metals. ***ACS Appl. Mater. Interfaces*. 2018**, 10, 20478–20486. Citations: 122.

**17)** **K. Villa,** J. Parmar, D. Vilela, S. Sanchez. Core-shell microspheres for the ultrafast degradation of estrogen hormone at neutral pH. ***RSC Advances*, 2018**, 8, 5840-5847. Open Access. Citations: 17.

**16)** A. M. Pourrahimi, **K. Villa**, Y. Ying, Z. Sofer, M. Pumera. ZnO/$ZnO_2$/Pt Janus Micromotors Propulsion Mode Changes with Size and Interface Structure: Enhanced Nitroaromatic Explosives Degradation under Visible Light. ***ACS Appl. Mater. Interfaces*, 2018**, 10, 42688–42697. Citations: 82.

**15)** J. Parmar, D. Vilela, **K. Villa**, J. Wang, S. Sanchez. Micro- and Nanomotors as Active Environmental Microcleaners and Sensors. ***J. Am. Chem. Soc*., 2018**, 140, 9317–9331. Citations: 375.
This review article was one of the most highly cited publications in JACS for the period 2018-2019.

**2017**

**14)** J. Parmar, **K. Villa**, D. Vilela, S. Sanchez. Platinum-free cobalt ferrite based micromotors for antibiotic removal. ***Appl. Mat. Today*. 2017**, 9, 605-611. Citations: 57.

**13)** S. Murcia-López, M. C. Bacariza**,** **K. Villa**, J. M. Lopes, C. Henriques, J. R. Morante, T. Andreu. Controlled photocatalytic oxidation of methane to methanol through surfaces modification of beta zeolites. ***ACS Catal.* 2017**, 7, 2878-2885. Citations: 99.

**2016**

**12)** **K. Villa,** X. Domènech. U. M. García-Pérez. J. Peral. Optimization of the experimental conditions of hydrogen production by the Pt-(CdS/ZnS) system under visible light illumination. ***RSC Adv.*, 2016**, 6, 36681-36688. Citations: 29.

**11)** **K. Villa*,** S. Murcia-López, J. R. Morante, T. Andreu. An insight on the role of La in mesoporous $WO_3$ for the photocatalytic conversion of methane into methanol. ***Appl. Catal. B.* 2016**, 187, 30-36. Citations: 142.

**10)** **K. Villa**, X. Domènech. U. M. García-Pérez. J. Peral. Photocatalytic hydrogen production under visible light by using a CdS/$WO_3$ composite. ***Catal. Letters,* 2016**, 146, 100-108. Citations: 28.

**2015**

**9)** **K. Villa***, S Murcia-López, T. Andreu, J.R. Morante. On the role of $WO_3$ surface hydroxyl groups for the photocatalytic partial oxidation of methane to methanol. ***Catal. Commun*. 2015**, 58, 200-203. Citations: 73.

**8)** S. Murcia-López, **K. Villa**, T. Andreu, J. R. Morante. Improved selectivity for partial oxidation of Methane to methanol in the presence of nitrite ions and $BiVO_4$ photocatalyst. ***Chem. Commun*. 2015**, 51, 7249-7252. Citations: 81.

**2014**

**7) K. Villa*,** S. Murcia-López, T. Andreu, J. R. Morante. Mesoporous $WO_3$ photocatalyst for the partial oxidation of methane to methanol using electron scavengers. ***Appl. Catal. B.* 2014**, 163, 150-155. Citations: 203.

**6)** S. Murcia-López, **K. Villa**, T. Andreu, J. R. Morante. Partial oxidation of methane to methanol using Bismuth-Based photocatalysts. ***ACS Catal*., 2014**, 4, 3013-3019. Citations: 144.

**2013**

**5) K. Villa**, X. Domènech. S. Malato, M. I. Maldonado, J. Peral. Heterogeneous photocatalytic hydrogen generation in a solar pilot plant***. Int. J. Hydrogen Energy*. 2013**, 38, 12718–12724. Citations: 78.

**2012**

**4) K. Villa**, A. Black, X. Domènech. J. Peral. Nitrogen doped $TiO_2$ for hydrogen production under visible light irradiation. ***Solar Energy*. 2012**, 86, 558–566. Citations: 59.

**2011**

**3)** F. Gordillo, **K. Villa**, E. Marin. Shifting to the red the absorption edge in $TiO_2$ films: a photoacoustic study. ***Superficies y Vacío*, 2011**, 24, 20-23. Citations: 7.

**2010**

**2) K. Villa**, F, Gordillo, F. Zarate. Photocatalytic efficiency of $TiO_2Ag/TiO_2$ multilayer films grown by sol-gel technique. ***The Biologist (Lima).* 2010**, 8, 29-34.

**2008**

**1)** F. Gordillo, **K. Villa,** C. Mejía-Morales. Titanium dioxide nanocrystalline bactericidal thin films grown by sol–gel technique. ***Microelectronics J.* 2008**, 39, 1333-1335. Citations: 14.

## ORGANIZATION OF SCIENTIFIC MEETINGS

Molecular and Nanophotonic Machines, Devices, and Applications VIII. **SPIE Optics + Photonics 2025**. August 3-7, 2025. San Diego, California (USA). **Program Committee**

Symposium F “Photocharging materials, light driven ionics and their applications in energy conversion & storage”. **Fall Meeting, E-MRS** conference. September 16-19, 2024, Warsaw, Poland. Average number of attendees: from 50-60. **Organizing committee and Chair.**

Symposium #PhotoMat - Advances in Photo-driven Energy Conversion and Storage: From Nanoscale Materials to Sustainable Solutions. **MATSUS2024.** March 4-8, 2024. Barcelona, Spain. Average number of attendees: from 60-80. **Organizing committee and Chair.**

Webinar on “Materials for Water splitting” in collaboration with **IOP publishing** 2024, *online*. Average number of attendees: from 40-50.
**Organizing committee and Chair.**

Webinar on “European strategies and perspectives for converting solar energy to fuels” within the framework of the **European SUN2CHEM** project. October 24, 2023, *online*. Average number of attendees: from 40-50.
**Organizing committee.**

2022 ICIQ seminar program that included invited national and international speakers from Europe, USA, and Japan. two/three speakers per month). Average number of attendees: from 80-120 people. ICIQ, Spain.
**Chair and Organizer.**

Spanish National meeting 2010 of groups working on Photocatalysis with $TiO_2$. Autonomous University of Barcelona, Spain. It attracted more than 60 participants.
**Organizing committee.**

## PARTICIPATION IN WORKSHOPS TO TRAIN YOUNG SCIENTISTS

**Invited panelist.** IV workshop: Crafting an ERC Starting Proposal. Academia Joven de España. September 29, 2023, o*nline*. **Organizing committee.**

**Invited panelist.** "From frontier research to knowledge" BIST Forum, January 11th, 2024, Barcelona.

**Invited panelist.** IV workshop: Crafting an ERC Starting Proposal. Academia Joven de España. September 29, 2023, o*nline*. **Organizing committee.**

**Invited speaker**. Point of view as MSCA evaluator. MSCA-PF 2024 Workshop. June 12, 2024. Institute of Chemical

**Invited panelist.** Starting Grants 2023 – sessió de coaching. FECYT and AGAUR. April 25, 2023, *online*.

**Invited speaker**. Point of view as MSCA evaluator. MSCA-PF 2022 Workshop. June 10, 2022. Institute of Chemical Research of Catalonia (ICIQ).

## SELECTED INVITED TALKS/LECTURES

03/12/2025. **Invited talk.** CECAM workshop “Unveiling self-phoretic colloidal propulsion”. **Lausanne, Switzerland.**

21/08/2025. **Invited talk.** Dream Reactions: towards a sustainable future Symposium. **Munster, Germany.**

10/07/2025. **Keynote lecture.** 17th International conference on materials chemistry (MC17). Royal Society of Chemistry. **Scotland, UK.**

23/05/2025. **Keynote lecture.** Workshop series organized by the thematic network group “Quasi Living Systems: Merge and Emerge”. **Barcelona, Spain**.

03/01/2025. **Invited lecture.** Programmable Self-Assembly of Photoactive Colloidal Motors via Light Shaping. Current Trends in Active Matter Physics 2025 (CTAMP 2025). **Bangalore, India.**

22/11/2024. **Invited lecture.** Multifunctional microrobots powered by light energy. Twilight Conference. **Madrid, Spain.**

06/11/2024. **Invited seminar.** Photocatalysis. SHARP training program for PhD students. ICIQ. **Tarragona, Spain.**

24/10/2024. **Keynote lecture.** Photocatalytic Micromotors for Water Purification and Waste Valorization. Workshop on “active nano/microsystems in the Spanish context”. **Barcelona, Spain.**

19/08/2024. **Invited talk**. Engineering of light-responsive nanorobots for targeted functions. SPIE Optics + Photonics 2024 (Molecular and Nanophotonic Machines, Devices, and Applications VII). **San Diego, USA.**

15/08/2024. **Keynote lecture.** Dynamic interactions and programmable self-assembly in light-driven micromotors. ArtBio 2024. August 14-16, 2024. **Aarhus, Denmark.**

02/07/2024**. Keynote lecture.** Tailoring light-driven micromotors for selective oxidative reactions. Light-nanoMatter Interaction Summer School. **Madrid, Spain.**

04/06/2024. **Invited talk and Academic committee member.** Engineering photoactive micromotors for targeted functions**.** Nanomotors International Conference**. Barcelona, Spain.**

14/12/2023. **Keynote lecture**. From Design to Motion: Unveiling the Potential of Light-Driven Microswimmers. 13th Early-Stage Researchers Workshop in Nanoscience. IMDEA Nanoscience. **Madrid, Spain.**

30/11/2023. **Invited seminar.** *Micromotores fotoactivos autopropulsados para la remediación ambiental*. Universidad de Antioquia. **Medellín, Colombia.**

14/11/2023. **Keynote lecture**. Light-Powered Nanomotors: Innovations in Sustainable Water Cleanup**.** XIX Simposio Jóvenes Investigadores RSEQ. **Murcia, Spain.**

03/11/2023**. Invited seminar.** *Microrobots que limpian agua contaminada*. ACS Webinar, *online*. It attracted more than 300 participants from over 27 countries.

10/10/2023. **Invited talk**. Visible-light photoactivated microrobots based on single-component semiconductors. Special session "Matter in motion" at MARSS 2023. **Abu Dhabi, EUA**.

04/10/2023. **Invited seminar.** Photocatalysis. SHARP training program for PhD students. ICIQ. **Tarragona, Spain**

04/09/2023. **Invited talk.** Enhanced propulsion of photoactive nanomotors under external magnetic fields. International Conference on Excited States of Transition Elements. **Świeradów Zdrój, Poland**.

08/21/2023. **Oral presentation.** Light-driven photocatalytic micromotors with surface recognition sites. IUPAC chains. **The Hague, Netherlands.**

21/07/2023. **Keynote lecture**. Visible-light responsive photocatalytic micromotors based on single-component SemiconductorsAnnual meeting. The Biomedical Research Center (CINBIO). **Vigo, Spain.**

18/07/2023. **Oral presentation.** Photocatalytic CO2 reduction in gas phase. Oral talk. Conference on Artificial Photosynthesis and Green Catalysis (CAP GC). **Lausanne, Switzerland.**

30/05/2023. **Invited Keynote speaker** along with **Prof. Ben L. Feringa** (Nobel Prize) and **Prof. Javier García Martínez** (IUPAC President)**.** Light-driven photocatalytic micromotors based on single-component semiconductors. Jornades doctorals UAB. **Barcelona, Spain.** https://www.uab.cat/es/quimica/noticias/20230517/jornades-doctorals-2023.

28/04/2023. **Invited talk**. Anisotropic photocatalytic micromotors for environmental remediation. NanoSpain 2023. **Tarragona, Spain.**

29/11/2022. **Invited seminar.** Nanostructured photocatalysts for energy conversion and environmental remediation. Institute of Photonic Sciences (ICFO), **Castelldefels, Spain.**

20/10/2022. **Oral presentation.** Photocatalytic microswimmers for cargo transportation and environmental Applications. Seventh International Conference on Multifunctional, Hybrid and Nanomaterial, Materials Today. **Genoa, Italy.**

17/10/2022. **Invited seminar.** Artificial self-propelled microswimmers for biomedical and environmental remediation. BIST Master-MMRES, *online*.

22/06/2022. **Invited talk.** Light-driven Photocatalytic Microswimmers for Removal of Microbial Contamination. Global Conference on Nanotechnology, Nanoseries, *online*.

03/05/2022. **Invited lecture.** Light-driven microrobots for environmental remediation. Materiales avanzados para una sociedad sostenible**. Zaragoza, Spain.**

04/06/2021. **Keynote lecture.** Cooperative interactions of photoactivated micromotors for removal of emerging pollutants. ICRA2021 workshop on micro-nano swarm robotics, *online*.

26/08/2019**. Oral presentation.** $BiVO_4$ and $C_3N_4$ photocatalytic motors: towards cell manipulation. International Conference on Micro/nanomachines**. Harbin, China.**

12/08/2015. **Invited talk and chair session.** Ordered mesoporous $WO_3$ photocatalyst for the selective oxidation of methane to methanol. 4th International Symposium on Energy Challenges and Mechanics (ECM4) - working on small scales International Symposium on Energy and Nanomaterials. **Aberdeen, Scotland.**

## INVITED OUTREACH ACTIVITIES AIMED AT NON-SPECIALIZED AUDIENCE

**Invited talk.** Micromotores para la eliminación de bacterias. Late Show: la investigación a escena.
Language: Spanish. Date: 27/09/2024. Tarragona, Spain.
Link: https://caixaforum.org/es/tarragona/p/late-show-la-investigacion-a-escena_a168572707

**Invited guest** at Arran de Mar. Micromotores fotoactivos para descontaminación microbiana.
Language: Spanish/Catalan. Date: 30/04/2024. Tarragona, Spain.
Link: https://www.tarragonaradio.cat/katherine-villa-es-molt-interessant-poder-eliminar-bacteris-de-laigua/

**Invited talk.** Nanorobots per descontaminar l'aigua. Microxerrades divulgatives de ciència "Recerca pel canvi" in the framework of the **European's research night** to explain in a colloquial way the results of our ongoing ERC-StG project (PhotoSwim).
Language: Spanish. Date: 05/10/2023. Reus, Spain.
Link: https://www.iispv.cat/coneix-la-ciencia-amb-do-tarragona/

**Invited guest** at the podcast Blau de Prússia: "'Cursa dels Fotoquímics' 2023 to explain my research on photoactive micro/nanorobots for environmental remediation. **Tarragona radio**.
Language: Spanish/Catalan. Date: 04/07/2023. Tarragona, Spain.
Link: Blau de Prússia: "La cursa dels fotoquímics: Nanoswimmers i motors fotocatalítics " - Tarragona Ràdio – Notícies, programes i podcasts de Tarragona (tarragonaradio.cat).

**Interview** by the company *Fuchs Lubricantes* to discuss light-driven micromotors and their avenues in energy.
Language: Spanish. Date: 05/04/2023. *Online*.

**Invited moderator** of the session "Hydrogen, key vector of the energy transition" Cercle d'Economia and FemCat.
Language: Spanish. Date: 18/05/2023. Barcelona, Spain.
Link:https://cercledeconomia.com/en/event/lhidrogen-vector-clau-de-la-transicio-energetica/

Participation as **guest speaker** in the Science week at **British School of Costa Daurada**. Topic: "A circus of Science practical investigations" by preparing scientific experiments for kids (6 years old).
Language: English. Date: 14/03/2023. El Catllar, Spain.

**Interview** at *revista QEI edición 2022-I Ambiental* by the **Colombian Chemical Society** to talk about my research trajectory and highlight the impact of our research in the environmental field.
Language: Spanish. Date: 09/12/2022. *online*.
Link to the Youtube video: https://www.youtube.com/watch?v=9nadevnYrdA&t=54s.

**Invited guest** at Blau de Prússia: "Science Week 2022". **Tarragona radio**.
Language: Spanish/Catalan. Date: 21/11/2022. Tarragona, Spain.
Link: https://alacarta.tarragonaradio.cat/programs/blau-de-prussia/tarragonaradio_podcast_31805

**Invited guest** at the program "Ones de Ciencia" that aims to highlight the research done in Catalonia. Chapter 47. Photocatalysis by **Radio Cambrils.**
Language: Spanish/Catalan. Date: 24/10/2022. Cambrils, Spain.
Link: https://www.radiocambrils.cat/programs/ones-de-ciencia/radiocambrils_podcast_195

**Interview** by la Caixa Foundation "Bringing Science home" to describe my research trajectory and explain my la Caixa project. Language: English. Date: 22/09/2022. *Online*.
Link: https://becarios.fundacionlacaixa.org/en/web/guest/stories/historia-posdoctorado-junior-leader-2022

**Invited panelist** of a roundtable about the problems that female researchers face in a scientific career in the framework of Global Women Breakfast organized by **IUPAC**.
Language: Spanish/Catalan. Date: 16/02/2022. Tarragona, Spain.
Link: https://www.fq.urv.cat/ca/tauler-anuncis/54/gwb2022-a-tarragona-dones-investigadores-en-quimica-i-bioquimica-una-taula-rodona

**Invited talk.** Smart photocatalytic materials for energy and environmental applications.**Bojos per la Química**.
Language: English. Date: 07/05/2022. Tarragona, Spain. (ICIQ).
Link to Twitter: https://twitter.com/ICIQchem/status/1523614187376627712

**Invited guest** at Podcast Blau. de Prússia: "Dopamina i oxitocina: dos perfils i una vida". **Tarragona radio**.
Language: Spanish/Catalan. Date: 03/05/2022. Tarragona, Spain.
Link:https://alacarta.tarragonaradio.cat/programs/blau-de-prussia/tarragonaradio_podcast_30362

**Participant** of the **Inspira STEAM** program that included 6 sessions to eradicate gender stereotypes at Escola Molí de Vent.
Language: Spanish. Dates: March-May 2021. Torredembarra, Spain.
Links: https://twitter.com/ICIQchem/status/1509123339868069900
https://www.iciq.org/iciq-participates-in-inspira-steam/.

**Interview** at **Diari Ara**, Camp de Tarragona. Difficulties of women in science. Language: Catalan. Date: 17/02/2021. Online. Link: https://www.ara.cat/campdetarragona/dificultats-dones-mon-ciencia_1_3874958.html

**Didactic talk** about '*Micro-nadadores artificiales para la descontaminación de agua con luz solar*' in the framework of the #100tífiques 2021 program by FCIR/BIST.
Language: Spanish. Date: 11/02/2021 at the Institut Jonqueres, Spain.
Link: https://buenaquimica.org/el-iciq-participa-en-la-tercera-edicion-de-100tifiques/

**Explanatory video** of my recent publication on solar fuels generation (Royal Society of Chemistry) that already counts with more than 2.1 K Twitter views.
Link to Twitter: https://twitter.com/ICIQchem/status/1433323868303859713.

**Interview** by the University of Chemistry and Technology, Prague to promote the interest of national/international undergraduate students in pursuing a PhD at the Czech Republic.
Language: English. Date: 14/12/2020. Online.
Link: https://phd.vscht.cz/zajemci-o-phd/proc-doktorat-vscht/doktorandi/katherine-villa

**Inteview** about self-propelled microrobots developed at the Advanced Functional Nanorobots center at National Czech TV (Česká televize). Language: English.
**Link:** https://ct24.ceskatelevize.cz/veda/2797685-nanoroboti-zmeni-budoucnost-mediciny-pomohou-zejmena-u-nadorovych-onemocneni

## TEACHING ACTIVITIES

2020 **AQU certification for professor lector.** Agency for the Quality of the Catalan University System.

2009–2013 **Official teaching. Autonomous University of Barcelona, Spain**. *Experimentation and documentation in Chemistry, Supramolecular Chemistry, and Molecular Recognition, Chemistry.* Faculty of Science and Bioscience. Academic year: 2012/2013. Teaching hours: 50.14 h.
*Physical Chemistry laboratory practices (Chemical Kinetics and Thermodynamics).* Faculty of Science. Academic year: 2011/2012. Teaching hours: 50.0 h.
*Chemical bond and Structure of Matter.* Faculty of Science. Academic year: 2010/2011. Teaching hours: 61.45 h.
*Physical Chemistry laboratory practices.* Faculty of Science. Academic year: 2009/2010. Teaching hours: 45 h.

## COMMISSIONS OF TRUST

**Evaluator.** HORIZON-MSCA-2023-DN. Agency: **European Commission**. Dates: 01/10/2024-26/01/2024.

**Evaluator.** Proyectos generación de conocimiento. Agency: **Agencia Estatal de Investigación, Spain**.
Dates: 01/05/2024-14/06/2024.

**External evaluator.** ERC Consolidator. Agency: **European Commision**. Dates: August 2023.

**Evaluator.** Ramón y Cajal Call 2023. Agency: **Agencia Estatal de Investigación, Spain**.
Dates: 06/07/2023-08/07/2023.

**Evaluator.** Juan de la Cierva Call 2023. Agency: **Agencia Estatal de Investigación, Spain**. Date: 21/06/2023.

**Evaluator.** Grant proposals. Agency: **National Science Center, Poland**. Dates: 21/03/2023-11/04/2023.

**Evaluator.** EIC PATHFINDER OPEN 2022. Agency: **European Innovation Council**.Dates: 10/06/2022-12/07/2022.

**Evaluator.** OCENW research proposals. Agency: **Dutch Research Council**. Dates:12/03/2022-04/04/2022.

**Evaluator.** Horizon-MSCA-PF-2021 and 2022. Agency: **European Commission**. Dates: 05/11/2021-28/01/2022 and 07/10/2022-21/11/2022, respectively.

**Evaluator.** FRG22-Comprehensive program. Agency: **United Arab Emirates**. Dates: 12/09/2021-10/01/2022.

**Evaluator.** Martí i Franquès COFUND- Doctoral Programme-2020 from the Universitat Rovira i Virgili (URV). Agency: **URV, COFUNDED by MSCA-H2020**. Dates: 12/14/2020-14/01/2021.

**Evaluator.** FET-OPEN – NOVEL IDEAS FOR RADICALLY NEW TECHNOLOGIES. Agency: **European Commission**.
Dates: 01/07/2020- 27/01/2020.

## MEMBER OF EVALUATION COMMITTEES

2024 **Member of Academic Committee and Industrial Committee of ICIQ.**

2024 **Member of PhD evaluation committee (Vocal):** Elena Cabello Olmo. Thesis title: Nanophosphor-based photonics. Supervisors: Prof. Hernán Miguez García and Dr. Gabriel Lozano Barbero, October 30, 2024. Instituto de Ciencia de los Materiales de Sevilla, Spain.

2023 **Member of master evaluation committee:** Master's Degree in Synthesis, Catalysis and Molecular Design. Dirk Hüsstege. Thesis title: Self-Assembly, characterization and study of the properties of a Calix-pyrrole. Supervisors: Prof. Pablo Ballester and Dra. Gemma Aragay. June 22, 2023.
Universitat Rovira I Virgili (URV). Tarragona, Spain.

2023 **Member of the evaluation committee:** poster session of BIST Symposium on Microscopy. March 10, 2023. Institute of Photonic Sciences (ICFO). Castelldefels, Spain.

2023 **Member of PhD evaluation committee (Substitute):** Xavier Arqué. Thesis title: Fundamental Aspects of Enzyme-powered Micro-/Nanomotors. Supervisors: Prof. Samuel Sánchez and Dr. Tania Patiño. January 21, 2023. University of Barcelona/IBEC. Barcelona, Spain.

2022 **Member of PhD evaluation committee (President):** Martí Biset. Thesis title: DPD Plasma Reactor for $CO_2$ methanation. Supervisors: Prof. Joan R. Morante and Dr. Teresa Andreu. January 21, 2022.
University of Barcelona/IREC. Barcelona, Spain.

2021 **Member of BIST MMRES evaluation committee:** Serena de Mahnoor (IBEC), Santiago Ortiz (ICFO), and Marta Perxes (ICN2), September 9, 2021.
UPF/ Campus Universitario Mar. Barcelona, Spain.

## EDITORIAL ACTIVITIES

2025 **Member of the Early Career Board**. Nano Letters (American Chemical Society).
2023 **Member of the Early Career Board**. Applied Catalysis B (Elsevier).
2023 **Guest editor** of Special Issue " Photocatalytic Hydrogen Production" in Global Challenges (Willey).
2022 **Guest editor** of Special Issue " Micro/Nanorobots in Biofilm" in Frontiers in Cellular and Infection Microbiology (Frontiers).

## REFEREEING ACTIVITIES

*Nature, Nat. Energy, Nat. Commun. Nat. Nanotechnol. Appl. Catal., B, ACS Nano, JACS, Nanoscale, Chem. Commun., Angew. Chemie, ACS Catal., Nanoscale, ACS Applied Mater. Interfaces, Adv. Intel. Syst, Small, among others.*

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2019 Member, American Chemical Society (ACS). Member, Spanish Royal Society of Chemistry. Member, Catalan Chemical Society.

## MAJOR COLLABORATIONS

List of collaborators according to the research topic and international collaborative publications (Pie chart, Scopus):


**Light-driven photocatalytic micromotors:** Prof. Ramin Golestanian (Max Planck, Germany), Prof. Samuel Sánchez, IBEC (Spain), Prof. Giovanni Volpe (University of Gothenburg), Prof. Ignacio Pagonabarraga, UB (Spain), Dr. Juliane Simmchen (University of Strathclyde), Lei Wang (Harbin Institute of Technology, China) Prof. Daniel Ruiz, ICN2 (Spain), Prof. Pablo Ballester, ICIQ (Spain) and Luis Lis-Marzán, CIC biomaGUNE (Spain).

**Advanced functional materials and solar fuels:** Prof. Philippe Smet. Ghent University (Belgium) and Prof. Zdenek Sofer (UCT, Czech Republic). Prof. Jordi Arbiol (ICN2). Prof. Graham Newton, University of Nottingham (UK). Prof. Aitziber López Cortajarena, CIC biomaGUNE (Spain). Prof. José Ramón Galán-Mascarós and Prof. Núria López, ICIQ (Spain), Dr. Teresa Andreu, University of Barcelona (Spain)**,** Prof. Carlos Henriques, Instituto Superior Técnico, Universidade de Lisboa (Portugal), Dr. Manuel I. Maldonado. Solar Platform of Almeria (Almeria, Spain). Prof. Ulises M. García-Pérez. Universidad Autónoma de Nuevo León (México). Prof. Feliu Maseras, ICIQ (Spain).