











Alessio Dessì

Researcher at National Research Council, Institute of Chemistry of Organometallic Compounds (CNR-ICCOM) since 11/2019.

-  Birth date: 06/11/1987
-  Nationality: Italian
-  Phone number: +39 055 522 5205
-  Orcid number: 0000-0002-2813-2369
-  Scopus Author ID: 55632891300
-  Web of Science ResearcherID: G-7845-2019
-  E-mail: a.dessi@iccom.cnr.it



Education

-  [Ph.D. in Chemical Sciences](#) (2012-2016 - XXVIII cycle) at University of Florence
Thesis: Organic synthesis applied to photovoltaics: new efficient sensitizers for transparent and near infrared (NIR) absorbing Dye-Sensitized Solar Cells
-  [Master's Degree in Chemistry](#) (2010-2012) at University of Pisa (110/100 cum laude)
-  [Bachelor's Degree in Chemistry](#) (2006-2009) at University of Pisa (110/100 cum laude)

Previous Professional Experiences

-  09/2017 - 11/2019  [Post-doctoral Fellowship - Principal Investigator \(with Dr. Gianna Reginato\)](#)
 -  Study of new organic dyes for innovative eco-save photovoltaic greenhouses (Project FOTOSER funded by Pistoia Giovani e Ricerca Scientifica 2016)
 -  National Research Council - Institute of Chemistry of Organometallic Compounds (CNR-ICCOM); Area di Ricerca di Firenze, Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI), Italy
- 09/2016 - 08/2017 [Post-doctoral Fellowship](#)
 -  Design, functionalization and characterization of innovative materials for the production of energy from renewable energy supplies (Project SELFIE funded by Regione Toscana)
 -  National Research Council - Institute of Chemistry of Organometallic Compounds (CNR-ICCOM); Area di Ricerca di Firenze, Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI), Italy

- 02/2016 - 08/2016 [Postdoctoral fellowship](#)
📄 **New materials with optical properties suitable for applications in energy production and bioassay (Joint Lab CNR - University of Strasbourg)**
📍 National Research Council - Institute of Chemistry of Organometallic Compounds (CNR-ICCOM); Area di Ricerca di Firenze, Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI), Italy
- 09/2012 - 11/2012 [Grant Holder](#)
📄 **Stereoselective synthesis of new nitrogen-containing heterocycles (PRIN 2009)**
📍 National Research Council - Institute of Chemistry of Organometallic Compounds (CNR-ICCOM); Area di Ricerca di Firenze, Via Madonna del Piano 10, 50019 Sesto Fiorentino (FI), Italy

Research interests

The research activity has been developed in the field of **organic and organometallic chemistry**. **Sustainable synthetic methodologies**, based on the employment of organometallic reagents in organic synthesis, have been established and applied to the design and synthesis of new materials, which have found application in the field of **photovoltaics** and **photocatalytic hydrogen production**. In particular, the employment of boron- and tin-containing organometallic reagents, the optimization of Pd-catalyzed cross-coupling reactions and the development of **one-pot direct arylation protocols** have been deeply studied and applied to the synthesis of heterocyclic scaffolds and poly-conjugated compounds. **Innovative synthetic processes** with high efficiency and selectivity have been developed thanks to the employment of organometallic reagents, transition metal-based catalysts and **unconventional synthetic techniques** (e.g. MW-activation). The products with proper physicochemical properties have found application both in high-efficiency and high-transparency photovoltaic devices (**DSSCs**), particularly suitable for building-integrated photovoltaics, and in the **photocatalytic hydrogen production starting from sustainable feedstock**.

Publications in peer-reviewed journals (18)

H-index = 8

- ⊗ [Tuning the Properties of Benzothiadiazole Dyes for Efficient Visible Light-Driven Photocatalytic H₂ Production under Different Conditions](#) M. Bartolini, V. Gombac, A. Sinicropi, G. Reginato, A. Dessì, A. Mordini, J. Filippi, T. Montini, M. Calamante, P. Fornasiero, L. Zani, *ACS Applied Energy Materials*, **2020**, 3, 8912. (IF: 4.473; DOI: 10.1021/acsaem.0c01391)
- ⊗ [Ground-State Redox Potentials Calculations of D- \$\pi\$ -A and D-A- \$\pi\$ -A Organic Dyes for DSSC and Visible-Light-Driven Hydrogen Production](#) S. Mohammadpourasl, F. Fabrizi de Biani, C. Coppola, M. L. Parisi, L. Zani, A. Dessì, M. Calamante, G. Reginato, R. Basosi, A. Sinicropi, *Energies*, **2020**, 13, 2032. (IF: 2.702; DOI: 10.3390/en13082032)
- ⊗ [Combined LCA and Green Metrics Approach for the Sustainability Assessment of an Organic Dye Synthesis on Lab Scale](#) M. L. Parisi, A. Dessì, L. Zani, S. Maranghi, S. Mohammadpourasl, M. Calamante, A. Mordini, R. Basosi, G. Reginato, A. Sinicropi, *Frontiers in Chemistry*, **2020**, 8, 214. (IF: 3.693; DOI: 10.3389/fchem.2020.00214)
- ⊗ [Improving the Efficiency of Thin-Film Fiber-Shaped Dye-Sensitized Solar Cells by Using Organic Sensitizers](#) N. Sangiorgi, A. Sangiorgi, A. Dessì, L. Zani, M. Calamante, G. Reginato,

- A. Mordini, A. Sanson, *Solar Energy Materials and Solar Cells*, **2020**, *204*, 110209. (IF: 6.984; DOI: 10.1016/j.solmat.2019.110209)
- ⊗ Thiazolo[5,4-d]thiazole-Based Organic Sensitizers with Improved Spectral Properties for Application in Greenhouse-Integrated Dye-Sensitized Solar Cells A. Dessì, M. Calamante, A. Sinicropi, M. L. Parisi, L. Vesce, P. Mariani, B. Taheri, M. Ciocca, A. Di Carlo, L. Zani, A. Mordini, G. Reginato, *Sustainable Energy and Fuels*, **2020**, *4*, 2309-2321. (IF: 5.503; DOI: 10.1039/D0SE00124D)
 - ⊗ Dye-Sensitized Heterogeneous Photocatalysts for Green Redox Reactions G. Reginato, L. Zani, M. Calamante, A. Mordini, A. Dessì, *European Journal of Inorganic Chemistry*, **2020**, 899-917. (IF: 2.529; DOI: 10.1002/ejic.201901174)
 - ⊗ Combining Dithienosilole-Based Organic Dyes with a Brookite/Platinum Photocatalyst toward Enhanced Visible-Light-Driven Hydrogen Production O. Bettucci, T. Skaltsas, M. Calamante, A. Dessì, M. Bartolini, A. Sinicropi, J. Filippi, G. Reginato, A. Mordini, P. Fornasiero, L. Zani, *ACS Applied Energy Materials*, **2019**, *2*, 5600-5612. (IF: 4.473; DOI: 10.1021/acsaem.9b00782)
 - ⊗ New Blue Donor-Acceptor Pechmann Dyes: Synthesis, Spectroscopic, Electrochemical, and Computational Studies A. Dessì, A. Sinicropi, S. Mohammadpourasl, R. Basosi, M. Taddei, F. Fabrizi de Biani, M. Calamante, L. Zani, A. Mordini, P. Bracq, D. Franchi, G. Reginato, *ACS Omega*, **2019**, *4*, 7614-7627. (IF: 2.87; DOI: 10.1021/acsomega.8b03560)
 - ⊗ Transition Metal-Catalyzed Cross-Coupling Methodologies for the Engineering of Small Molecules with Applications in Organic Electronics and Photovoltaics L. Zani, A. Dessì, D. Franchi, M. Calamante, G. Reginato, A. Mordini, *Coordination Chemistry Reviews*, **2019**, *392*, 177-236. (IF: 15.367; DOI: 10.1016/j.ccr.2019.04.007)
 - ⊗ Extending the Conjugation of Pechmann Lactone Thienyl Derivatives: A New Class of Small Molecules for Organic Electronics Application A. Dessì, M. Bartolini, M. Calamante, L. Zani, A. Mordini, G. Reginato, *Synthesis-Stuttgart*, **2018**, *50*, 1284-1292. (IF: 2.675; DOI: 10.1055/s-0036-1591856)
 - ⊗ Towards Sustainable H₂ Production: Rational Design of Hydrophobic Triphenylamine-based Dyes for Sensitized Ethanol Photoreforming A. Dessì, M. Monai, M. Bessi, T. Montini, M. Calamante, A. Mordini, G. Reginato, C. Trono, P. Fornasiero, L. Zani, *ChemSusChem*, **2018**, *11*, 793-805. (IF: 7.962; DOI: 10.1002/cssc.201701707)
 - ⊗ The Stille Reaction: Applications in the Synthesis of Organic Dyes for DSSCs G. Reginato, A. Mordini, L. Zani, M. Calamante, A. Dessì, D. Franchi, *Chimia*, **2017**, *71*, 586-591. (IF: 0.786; DOI: 10.2533/chimia.2017.586)
 - ⊗ Photoactive Compounds Based on the Thiazolo[5,4-d]thiazole Core and Their Application in Organic and Hybrid Photovoltaics G. Reginato, A. Mordini, L. Zani, M. Calamante, A. Dessì, *European Journal of Organic Chemistry*, **2016**, *2*, 233-251. (IF: 2.889; DOI: 10.1002/ejoc.201501237)
 - ⊗ Thiazolo[5,4-d]thiazole-Based Organic Sensitizers with Strong Visible Light Absorption for Transparent, Efficient and Stable Dye-Sensitized Solar Cells A. Dessì, M. Calamante, A. Mordini, M. Peruzzini, A. Sinicropi, R. Basosi, F. Fabrizi de Biani, M. Taddei, D. Colonna, A. Di Carlo, G. Reginato, L. Zani, *RSC Advances*, **2015**, *5*, 32657-32668. (IF: 3.119; DOI: 10.1039/c5ra03530a)
 - ⊗ Cross-Coupling Reactions: Some Applications to the Synthesis of Thiazolothiazole- and Benzobisthiazole-Based Dyes for New Generation Solar Cells (DSSC) G. Reginato, M. Calamante, A. Dessì, A. Mordini, M. Peruzzini, L. Zani, *Journal of Organometallic Chemistry*, **2014**, *771*, 117-123. (IF: 2.304; DOI: 10.1016/j.jorganchem.2014.01.024)
 - ⊗ Organic Dyes with Intense Light Absorption Especially Suitable for Application in Thin-Layer Dye-Sensitized Solar Cells A. Dessì, M. Calamante, A. Mordini, M. Peruzzini, A. Sinicropi, R. Basosi, F. Fabrizi de Biani, M. Taddei, D. Colonna, A. Di Carlo, G. Reginato, L. Zani, *Chemical Communications*, **2014**, *50*, 13952-13955. (IF: 5.996; DOI: 10.1039/c4cc06160h)

- ⊗ [Microwave-Activated Synthesis of Thiazolo\[5,4-d\]thiazoles by a Condensation/Oxidation Sequence](#) A. Dessì, M. Calamante, A. Mordini, L. Zani, M. Taddei, G. Reginato, *RSC Advances*, **2014**, *4*, 1322-1328. (IF: 3.119; DOI: 10.1039/c3ra45015e)
- ⊗ [Organic Chromophores Based on a Fused Bis-Thiazole Core and Their Application in Dye-Sensitized Solar Cells](#) A. Dessì, G. Barozzino Consiglio, M. Calamante, G. Reginato, A. Mordini, M. Peruzzini, M. Taddei, A. Sinicropi, M. Laura Parisi, F. Fabrizi de Biani, R. Basosi, R. Mori, M. Spatola, M. Bruzzi, L. Zani, *European Journal of Organic Chemistry*, **2013**, *10*, 1916-1928. (IF: 2.889; DOI: 10.1002/ejoc.201201629)

Awards and Honors

- 2019 [Young Investigator Award \(YIA 2019\)](#) of the Department of Chemical Sciences and Materials Technologies (DSCTM-CNR)
- 2018 [“Flavio Bonati - GICO Junior” Award](#) of the Interdivisional Group of Organometallic Chemistry (G.I.C.O.) of the Italian Chemical Society (SCI)
- 2014 [Best Poster and Presentation](#) at the “Ischia Advanced School on Organic Chemistry (IASOC)”

Selected Lectures

- ⊗ [Conference Department CNR-DSCTM 2019](#) (28-30/10/2019, Brixen, Italy) *Better Call TTZ5: a sensitizer for energy and fuel production - Invited Lecture*
- ⊗ [“CDCO 2019” XXXIX National Congress of the Organic Chemistry Division of the Italian Chemical Society](#) (08-12/09/2019, Turin, Italy) *Photocatalytic hydrogen production by means of Pt/brookite TiO₂ sensitized with dithienosilole-based organic dyes*
- ⊗ [“Co.G.I.C.O. 2018” XIII Congress of the Interdivisional Group of Organometallic Group of the Italian Chemical Society](#) (18-20/07/2018, Florence, Italy) *Tailored Synthesis of Organic Photosensitizers: the Case Study of Thiazolo[5,4-d]thiazole-based Molecules - Plenary Lecture*
- ⊗ [Merck - Elsevier Young Chemist Symposium 2018](#) (19-21/11/2018, Rimini, Italy) *Dye-sensitized ethanol photoreforming for H₂ production*
- ⊗ [“Co.G.I.C.O. 2016” XII Congress of the Interdivisional Group of Organometallic Group of the Italian Chemical Society](#) (5-8/06/2016, Genova, Italy) *Pd-catalysed synthesis of blue organic dyes and their application as sensitizers for near-IR absorbing Dye-Sensitized Solar Cells*
- ⊗ [ENERCHEM-1” 1st Congress of the Interdivisional Group of the Italian Chemical Society on Chemistry of Renewable Energies](#) (18-20/02/2016, Florence, Italy) *Blue dyes for near-IR absorbing Dye-Sensitized Solar Cells*
- ⊗ [Ph.D. School “ISOS 2015” XL International Summer School on Organic Synthesis](#) (14-18/06/2015, Gargnano, Italy) *D-π-A organic dyes for transparent Dye-Sensitized Solar Cells (DSSC)*
- ⊗ [Ph.D. School “IASOC 2014” Ischia Advanced School of Organic Chemistry](#) (21-25/09/2014, Lacco Ameno, Italy) *Highly efficient organic chromophores based on a thiazolo[5,4-d]thiazole core and their application in Dye-Sensitized Solar Cells*
- ⊗ [“SISOC X” 10th Spanish-Italian Symposium on Organic Chemistry](#) (17-20/07/2014, Florence, Italy) *Highly efficient organic chromophores based on a thiazolo[5,4-d]thiazole core and their application in Dye-Sensitized Solar Cells*
- ⊗ [Ph.D. School “ISOC 2013” 9th International School of Organometallic Chemistry](#) (30/08-03/09/2013, Camerino, Italy) *Organic chromophores based on a fused bis-thiazole core and their application in Dye-Sensitized Solar Cells*

Member of the local organizing committee of:

- ✿ International Conference on Organometallic Chemistry (ICOMC 2018) 15-20/07/2018, Florence, Italy
- ✿ 1st Enerchem School - First Italian School on Renewable Energies 20-24/02/2018, Florence, Italy
- ✿ ENERCHEM-1, 1st Congress of the Interdivisional Group of the Italian Chemical Society on Chemistry of Renewable Sources 18-20/02/2016, Florence, Italy
- ✿ SISOC X, 10th Spanish-Italian Symposium on Organic Chemistry 17-20/07/2014, Florence, Italy
- ✿ TUMA 2013, XXXII Convegno Interregionale delle Sezioni Toscana Umbria Marche Abruzzo della Società Chimica Italiana 01-02/07/2013, Sesto Fiorentino, Italy

Dissemination

- ✿ Member of the CNR-ICCOM outreach project CIAO (ChemIstry EducAtion & CommunicatiOn) for dissemination activities especially aimed at high-school students. The goal is to communicate the basis of chemistry and to explain the activities of the Institute in the field of green chemistry.
- ✿ Member of the CNR-ICCOM work-group and organizer of the educational activity “Chemistry for renewable energies” at ScienzEstate 2016 (08-09/06/2016), 2017 (08-09/06/2017) and 2018 (07-08/06/2018), dissemination event for families and children held at CNR Research Area in Sesto Fiorentino, Italy.
- ✿ Finalist at FameLab Italy 2020, a worldwide spread talent-show dedicated to people who are involved in scientific dissemination activities.

Other activities

Member of the Italian Chemical Society (SCI) since 2016. Member of the Organic Chemistry division, the Interdivisional Group of Organometallic Chemistry, the Interdivisional Group of Chemistry of Renewable Energies, the Interdivisional Group for the Dissemination of the Chemical Culture.

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