

Benedetta Carlotti

CURRICULUM VITAE

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APPOINTMENTS:

OCTOBER 2022: Italian National **Habilitation as Full Professor** of Physical Chemistry.

AUGUST 2021–PRESENT: **Associate Professor** of Physical Chemistry at the Department of Chemistry, Biology and Biotechnology of the University of Perugia, Italy.

FEBRUARY 2019; JULY 2019; SEPTEMBER 2022; APRIL 2023–SEPTEMBER 2023; AUGUST 2024: **Visiting Professor** in the group of Prof. Theodore Goodson III at Department of Chemistry of the University of Michigan, Ann Arbor MI, USA.

SEPTEMBER 2018–JULY 2021: **Tenure Track Assistant Professor** of Physical Chemistry (Ricercatore a Tempo Determinato di tipo B) at the Department of Chemistry, Biology and Biotechnology of the University of Perugia, Italy.

APRIL 2017: Italian National **Habilitation as Associate Professor** of Physical Chemistry.

FEBRUARY 2017–SEPTEMBER 2018: **Research Associate** in the group of Prof. Theodore Goodson III at Department of Chemistry of the University of Michigan, Ann Arbor MI, USA.

JUNE 2014–JUNE 2018: **Fixed Term Assistant Professor** of Physical Chemistry (Ricercatore a Tempo Determinato di tipo A) at the Department of Chemistry, Biology and Biotechnology of the University of Perugia, Italy. **Principal Investigator** of the project “Two-photon absorbing quadrupolar molecular systems” financed by the Italian Ministry for University and Research (MUR) in the framework of the program “Futuro in Ricerca–FIRB 2013”.

EDUCATION:

MARCH 2008–JUNE 2014: **Post–Doc** in the group of Prof. Fausto Elisei at the Department of Chemistry, University of Perugia, Italy.

OCTOBER 2005–JANUARY 2007:

Visiting Research Scholar in the group of Prof. Lawrence A. Bottomley, School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta GA, USA.

FEBRUARY 2008: **PhD in Chemistry** at the University of Perugia, Italy.

Thesis Title: “Ultrafast and space resolved techniques for the investigation of simple and complex systems”.

Thesis Advisors: Prof. Fausto Elisei and Prof. Loredana Latterini.

JULY 2004: **Laurea Bachelor and Master Degree in Chemistry** at the University of Perugia, Italy. Valuation: 110/110 cum laude (Grade Point Average: 29.5/30.0).

Thesis Title: “Synthesis and photophysical properties of semiconductor nanocrystals”.

Thesis Advisors: Prof. Fausto Elisei and Prof. Loredana Letterini.

Winner of the Cultural **Prize “Luigi Casati” for young graduates** awarded by the Italian Academy of Lincei.

RESEARCH INTERESTS:

Photophysics of organic materials in solution and in film by employing steady state and time resolved (nanosecond and femtosecond resolved) spectroscopic techniques. Push–pull multibranching molecules interesting for applications as new low–cost materials in Non–Linear Optics, organic compounds able to efficiently function after light absorption as electron donors/electron acceptors for organic solar cells, singlet fission materials, thermally activated delayed fluorescence and aggregation induced emission materials for organic light emitting diodes (OLEDs), aromatic systems usable as selective colorimetric and fluorescent sensors for anions and cations, drugs and their complexes with biologically relevant metal ions and DNA, fluorescent proteins.

RESEARCH PROJECTS:

✓ **Local Unit Coordinator** within the project “Novel protein-based Genetically-Encoded Fluorescent Indicators (GEFI) for Functional Super-Resolution Imaging of Biomolecular Activities in Living Cells” financed by the Italian Ministry for University and Research (MUR) in the framework of the program “**Progetti di Ricerca di Rilevante Interesse Nazionale–PRIN 2022**” (n. 2022RRFJC4, in PE4-Physical and Analytical Chemical Sciences) with 195.163 EUROS. The research proposal got a score of 93/100.

✓ **Responsible** of the Task 3.2 “A platform for the generation of biohybrid systems” within the Work Package 3 “Innovative devices and systems based on biomaterials for biomedical applications” of Spoke 10 “Biomaterials” of the Innovation Ecosystem Vitality funded by the European Union and the MUR within the program **PNRR 2022**.

✓ **Principal Investigator** of the project “Two–photon absorbing quadrupolar molecular systems” financed by the MUR in the framework of the program “**Futuro in Ricerca–FIRB 2013**” (n. RBFR13PSB6, in PE4-Physical and Analytical Chemical Sciences) with 484.443 EUROS. The research proposal got a score of 18/18 being the first one in the ranking of the financed projects for the category Physical Sciences and Engineering (PE).

✓ **Responsible for the research project** “Development and Characterization of Organic Materials for Applications in Photovoltaics and Non-Linear Optics” financed by the Umbria Region (within the Piano Operativo Regionale UMBRIA FSE 2007-2013 Asse IV “Capitale Umano”) and carried out at the Department of Chemistry of the University of Perugia.

✓ Partecipazione to the project “Spectroscopy and dynamics of organic compounds: effect of the structure and medium on the properties of the electronic excited states” financed by the MUR in the framework of the program “Programmi di Ricerca Scientifica di Rilevante Interesse Nazionale–PRIN 2008”.

✓ Partecipazione (since 2004) to the project “Photophysical and photochemical characterization of organic chromophores in nanostructured systems and their applications” financed by the MUR in the framework of the “Centro di Eccellenza sui Materiali Innovativi Nanostrutturati per applicazioni chimiche, fisiche e biologiche (CEMIN)” of the University of Perugia.

PUBLICATIONS:

Total number of publications in international journals: **85**

(22 as first author; 27 as corresponding author)

h-index: **30** (according to Google Scholar), **27** (according to Scopus)

Total citations: **2157** (according to Google Scholar), **1927** (according to Scopus)

- 88) T. Nguyen, H. L. Puhl, E. Chen, K. Hines, C. Rani, P. S. Blank, **B. Carlotti**, Y. Kim, T. Goodson III* and S. S. Vogel* "Coherent exciton coupling in divergent fluorescent protein dimers." **Nature**, submitted.
- 87) L. Mencaroni, T. Bianconi, M. A. Mancuso, M. Sheokand, F. Elisei, R. Misra* and **B. Carlotti*** "Unlocking the Potential of Push-Pull Pyridinic Photobases: Aggregation-Induced Excited-State Proton Transfer." **Chem. Eur. J.**, under review.
- 86) C. Montanari, M. Sheokand, A. Cesaretti, E. Calzoni, R. Misra* and **B. Carlotti*** "Ad-hoc Functionalization of Phenothiazine Dioxide Derivatives to Achieve Blue Thermally Activated Delayed Fluorescence in Organic Nanoaggregates." **J. Phys. Chem. C**, under review.
- 85) A. Cesaretti, G. Pantella, G. Reali, G. Consiglio, C. G. Fortuna, F. Elisei, A. Spalletti and **B. Carlotti*** "Direct Observation of Guanine Photo-Oxidation from New Potential Anticancer Drugs Via Ultrafast Electron Transfer." **Mater. Adv.**, 2024, DOI: 10.1039/D4MA00428K.
- 84) C. Montanari, N. J. Tiwari, R. Misra* and **B. Carlotti*** "Boosting the Efficiency of Red Thermally Activated Delayed Fluorescence *via* Conjugation Enhancement in Push-Pull Naphthalimide Derivatives." **Chem. Eur. J.** 2024, DOI: 10.1002/chem.202402294.
- 83) M. Alebardi, C. Munzone, E. Sorbelli, A. Grasso, L. Mencaroni, F. Elisei, C. G. Fortuna, A. Spalletti, C. Bonaccorso* and **B. Carlotti*** "Ultrafast and Quantitative FRET Sensitization of Singlet Fission in Solution-Processable Para-Azaquinodimethane Films." **Adv. Funct. Mater.** 2024, 2403706, 1–13.
- 82) L. Mencaroni, F. Elisei, A. Marrocchi, A. Spalletti and **B. Carlotti*** "Intramolecular Singlet Fission Coupled with Intermolecular Triplet Separation as a Strategy to Achieve High Triplet Yields in Fluorene-Based Small Molecules." **J. Phys. Chem. B**, 2024, 128 (14), 3442–3453.
- 81) L. Mencaroni, M. Alebardi, F. Elisei, I. Škorić, A. Spalletti and **B. Carlotti*** "Unveiling the Double Triplet Nature of the 2Ag State in Conjugated Stilbenoid Compounds to Achieve Efficient Singlet Fission." **Phys. Chem. Chem. Phys.**, 2023, 25, 21089–21099.
- 80) C. Montanari, T. Bianconi, M. Sheokand, T. Teunens, G. Cavalletti, J. Cornil, R. Misra* and **B. Carlotti*** "Enabling Red Thermally Activated Delayed Fluorescence by Increasing the Push-Pull Strength in Naphthalimide-Phenothiazine Derivatives." **J. Mater. Chem. C** 2023, 11, 10893–10904.
- 79) A. Cesaretti, Z. Cai, J. Kim, H. Kim,* Y. Lei* and **B. Carlotti*** "Dual-State Emission and Two-Photon Absorption Tuned by Benzonitrile Substitution in 2,3,4,5-Tetraphenyl-1H-Pyrrole." **ChemPhotoChem** 2023, e202300040, 1–12.
- 78) M. Sheokand, L. Mencaroni, A. Ekbote, T. Bianconi, M. A. Mancuso, F. Elisei, **B. Carlotti*** and R.

- Misra* "Enabling Peculiar Photophysics and Mechanochromic Luminescence by Introducing Bromine in Push-Pull Pyridine Derivatives." **J. Phys. Chem. C** 2023, 127 (8), 4176–4187.
- 77) T. Bianconi, A. Cesaretti, P. Mancini, N. Montegiove, E. Calzoni, A. Ekbote, R. Misra and **B. Carlotti*** "Room-Temperature Phosphorescence and Cellular Phototoxicity Activated by Triplet Dynamics in Aggregates of Push-Pull Phenothiazine-Based Isomers." **J. Phys. Chem. B** 2023, 127 (6), 1385–1398.
- 76) L. Mencaroni, A. Cesaretti,* **B. Carlotti**, M. Alebardi, F. Elisei, A. Ratkovic, I. Skoric and A. Spalletti "Tuning the Photophysics of Two Arm Bis [(dimethylamino)styryl] benzene Derivatives by Heterocyclic Substitution." **Molecules** 2022, 27(24), 8725.
- 75) A. Cesaretti,* L. Mencaroni, C. Bonaccorso, V. Botti, E. Calzoni, **B. Carlotti**, C. G. Fortuna, N. Montegiove, A. Spalletti and F. Elisei "Amphiphilicity-Controlled Localization of Red Emitting Bicationic Fluorophores in Tumor Cells Acting as Bio-Probes and Anticancer Drugs." **Molecules** 2022, 27(12), 3713.
- 74) A. Cesaretti, T. Bianconi, M. Coccimiglio, N. Montegiove, Y. Rout, P. L. Gentili, R. Misra* and **B. Carlotti*** "Aggregation-Induced Emission in Phenothiazine-Based Fluorophores: an Insight into the Excited State and Aggregate Formation Mechanism." **J. Phys. Chem. C** 2022, 126 (25), 10429–10440.
- 73) M. Paolino,* M. Saletti, A. Reale, M. Licciardi, P. Varvarà, A. Marquette, J. Léonard, C. Bonechi, A. Donati, G. Giorgi, G. Giuliani, **B. Carlotti**, F. Ortica, L. Latterini, M. Gentile, E. Paccagnini, M. Olivucci and A. Cappelli* "Design, Synthesis and Characterization of a New Visible Light-Sensitive Molecular Switch and its PEGylation Towards a Self-Assembling Molecule." **Chem. Eur. J.** 2022, 28, e202201477, 1–12.
- 72) B. Storti, **B. Carlotti**, G. Chiellini, M. Ruglioni, T. Salvadori, M. Scotto, F. Elisei, A. Diaspro, P. Bianchini and R. Bizzarri* "An Efficient Aequorea victoria Green Fluorescent Protein for Stimulated Emission Depletion Super-Resolution Microscopy" **Int. J. Mol. Sci.**, 2022, 23, 2482.
- 71) L. Mencaroni, **B. Carlotti**,* F. Elisei, A. Marrocchi and A. Spalletti "Exploring a New Class of Singlet Fission Fluorene Derivatives with High-Energy Triplets", **Chem. Sci.**, 2022, 13, 2071–2078.
- 70) W. Dai, T. Bianconi, E. Ferraguzzi, X. Wu, Y. Lei, J. Shi, B. Tong, **B. Carlotti**,* Z. Cai,* and Y. Dong "Excited-State Modulation of Aggregation-Induced Emission Molecules for High Efficiency Triplet Exciton Generation", **ACS Materials Lett.**, 2021, 3, 12, 1767–1777.
- 69) G. Tassone, M. Paolino, C. Pozzi, A. Reale, L. Salvini, G. Giorgi, M. Orlandini, F. Galvagni, S. Mangani, X. Yang, **B. Carlotti**, F. Ortica, L. Latterini, M. Olivucci, and A. Cappelli* "Xanthopsin-like Systems via Site-Specific Click-Funtionalization of a Retinoic Acid Binding Protein", **ChemBioChem**, 2022, 23, e202100449, 1–11.
- 68) A. Cesaretti,* A. Spalletti, F. Elisei, P. Foggi, R. Germani, C. Fortuna, **B. Carlotti** "The Role of Twisting in Driving Excited State Symmetry Breaking and Enhanced Two-Photon Absorption in Quadrupolar Cationic Pyridinium Derivatives", **Phys. Chem. Chem. Phys.**, 2021, 23, 16739–16753.
- 67) L. Mencaroni, C. Bonaccorso, V. Botti, **B. Carlotti**, G. Consiglio, F. Elisei, C. Fortuna, A. Spalletti, A. Cesaretti* "Nonlinear Optical Properties of a New Panchromatic Series of Water-Soluble Bicationic Push-Pull Fluorophores", **Dyes and Pigments**, 2021, 194, 109620, 1–12.
- 66) Y. Rout, C. Montanari, E. Pasciucco, R. Misra,* **B. Carlotti*** "Tuning the Fluorescence and the Intramolecular Charge Transfer of Phenothiazine Dipolar and Quadrupolar Derivatives by

- Oxygen Functionalization”, **J. Am. Chem. Soc.**, 2021, 143 (26), 9933–9943.
- 65) A. K. Muthike, **B. Carlotti**, I. K. Madu, H. Jiang, H. Kim, Q. Wu, L. Yu, P. M. Zimmerman, T. Goodson III* “The Role of the Core Attachment Positioning in Triggering Intramolecular Singlet Exciton Fission in Perylene Diimide Tetramers”, **J. Phys. Chem. B**, 2021, 125, 5114–5131.
- 64) L. Mencaroni, **B. Carlotti**, A. Cesaretti, F. Elisei, A. Grgičević, I. Škorić, A. Spalletti* “Competition between fluorescence and triplet production ruled by nitro groups in one-arm and two-arm styrylbenzene heteroanalogues”, **Photochem. Photobiol. Sci.**, 2020, 19, 1665–1676.
- 63) Y. Rout, A. Cesaretti, E. Ferraguzzi, **B. Carlotti**,* R. Misra* “Multiple Intramolecular Charge Transfers in Multimodular Donor-Acceptor Chromophores with large Two-Photon Absorption”, **J. Phys. Chem. C**, 2020, 124, 24631–24643.
- 62) **B. Carlotti**, I. K. Madu, H. Kim, Z. Cai, H. Jiang, A. K. Muthike, L. Yu, P. M. Zimmerman and T. Goodson III* “Activating intramolecular singlet exciton fission by altering π -bridge flexibility in perylene diimide trimers for organic solar cells”, **Chem. Sci.**, 2020, 11, 8757–8770.
- 61) M. Poddar, A. Cesaretti, E. Ferraguzzi, **B. Carlotti*** and R. Misra* “Singlet and Triplet Excited-State Dynamics of 3,7-Bis(arylethynyl)phenothiazines: Intramolecular Charge Transfer and Reverse Intersystem Crossing”, **J. Phys. Chem. C**, 2020, 124, 17864–17878.
- 60) A. Cesaretti, P. Foggi, C. G. Fortuna, F. Elisei, A. Spalletti and **B. Carlotti*** “Uncovering Structure–Property Relationships in Push–Pull Chromophores: A Promising Route to Large Hyperpolarizability and Two-Photon Absorption”, **J. Phys. Chem. C**, 2020, 124, 15739–15748.
- 59) **B. Carlotti**,* M. Poddar, F. Elisei, A. Spalletti and R. Misra* “Energy Transfer and Charge Transfer Dynamics in Highly Fluorescent Naphthalimide–BODIPY Dyads: Effect of BODIPY Orientation”, **J. Phys. Chem. C**, 2019, 123, 24362–24374.
- 58) M. Soderberg, B. Dereka, A. Marrocchi, **B. Carlotti** and E. Vauthey* “Ground State Structural Disorder and Excited State Symmetry Breaking in a Quadrupolar Molecule”, **J. Phys. Chem. Lett.**, 2019, 10, 2944–2948.
- 57) A. Cesaretti, **B. Carlotti**,* F. Elisei and A. Spalletti “Effect of the size of polycyclic aryl groups on the competition between adiabatic/diabatic photoisomerization mechanisms of cis-styrylarenes”, **Photochem. Photobiol. Sci.**, 2019, 18, 2125–2135.
- 56) N. Duran-Giner, **B. Carlotti**, C. Clementi, F. Elisei, S. Encinas Perea, and M. A Miranda* “Transient Absorption Spectroscopic Studies on 4-Nitroquinoline N- Oxide: from Femtoseconds to Microseconds Timescale”, **Spectrochim. Acta A**, 2019, 216, 265–272.
- 55) C. Clementi,* **B. Carlotti**, C. Burattini, R. M. Pellegrino, A. Romani and F. Elisei “Effect of hydrogen bonding interaction on the photophysics of α - amino-orcein”, **Spectrochim. Acta A**, 2019, 214, 522–530.
- 54) E. L. Taylor, K. J. Metcalf, **B. Carlotti**, C. T. Lai, J. A. Modica, G. C. Schatz, M. Mrksich and T. Goodson III* “Long Range Energy Transfer in Protein Megamolecules”, **J. Am. Chem. Soc.**, 2018, 140, 15731–15743.
- 53) **B. Carlotti**, A. Cesaretti, G. Cacioppa, F. Elisei, I. Kikas, I. Skoric and A. Spalletti* “Fluorosolvatochromism and hyperpolarizability of one–arm and two–arms nitro-compounds bearing heterocyclic rings.”, **J. Photochem. Photobiol. A, Chem.**, 2019, 368, 190–199.
- 52) **B. Carlotti**, Z. Cai, H. Kim, V. Shaparov, I. K. Madu, D. Zhao, W. Chen, P. M. Zimmerman, L. Yu and T. Goodson III* “Charge Transfer and Aggregation Effects in the Performance of Planar vs.

Twisted Perylene Diimide Isomers as Electron Acceptors in Organic Solar Cells.” **Chem. Mater.**, 2018, 30, 4263–4276.

- 51) **B. Carlotti**,* A. Cesaretti, O. Cannelli, T. Giovannini, C. Cappelli, C. Bonaccorso, C. G. Fortuna, F. Elisei, and A. Spalletti “Evaluation of Hyperpolarizability from the Solvatochromic Method: Thiophene Containing Push–Pull Cationic Dyes as a Case Study”, **J. Phys. Chem. C**, 2018, 122, 2285–2296.
- 50) A. Cesaretti,* **B. Carlotti**, F. Elisei, C.G. Fortuna, G. Consiglio and A. Spalletti “Photoinduced ICT vs Excited Rotamer Intercoversion in two quadrupolar polyaromatic N–methylpyridinium cations”, **Phys. Chem. Chem. Phys.**, 2018, 20, 2851–2864.
- 49) O. Cannelli, T. Giovannini, A. Baiardi, **B. Carlotti**, F. Elisei, and C. Cappelli* “Understanding the interplay between the solvent and nuclear rearrangements in the negative solvatochromism of a push–pull flexible quinolinium cation”, **Phys. Chem. Chem. Phys.**, 2017, 19, 32544–32555.
- 48) F. Ricci, **B. Carlotti**,* B. A. Keller, C. Bonaccorso, C. G. Fortuna, T. Goodson III, F. Elisei and A. Spalletti “Two–Photon Absorption Enhancement Parallels Intramolecular Charge Transfer Efficiency in Quadrupolar Versus Dipolar Cationic Chromophores”, **J. Phys. Chem. C**, 2017, 121, 3987–4001.
- 47) A. Cesaretti,* **B. Carlotti**, F. Elisei, C.G. Fortuna, G. Consiglio and A. Spalletti “A cationic naphthyl derivative defies the Non Equilibrated Excited Rotamers principle”, **Phys. Chem. Chem. Phys.**, 2017, 19, 5262–5272.
- 46) F. Ricci, F. Elisei, P. Foggi, A. Marrocchi, A. Spalletti and **B. Carlotti*** “Photobehavior and Nonlinear Optical Properties of Push–Pull, Symmetrical, and Highly Fluorescent Benzothiadiazole Derivatives”, **J. Phys. Chem. C**, 2016, 120, 23726–23739.
- 45) M. Aschi,* V. Barone, **B. Carlotti**, I. Daidone, F. Elisei and A. Amadei “Photoexcitation and relaxation kinetics of molecular systems in solution: towards a complete in silico model”, **Phys. Chem. Chem. Phys.**, 2016, 18, 28919–28931.
- 44) **B. Carlotti**,* A. Cesaretti, P. L. Gentili, A. Marrocchi, F. Elisei and A. Spalletti “A two excited state model to explain the peculiar photobehaviour of a flexible quadrupolar D– π –D anthracene derivative”, **Phys. Chem. Chem. Phys.**, 2016, 18, 23389–23399.
- 43) A. Cesaretti,* **B. Carlotti**, P. L. Gentili, R. Germani, A. Spalletti and F. Elisei “Twisting in the excited state of an N–methylpyridinium fluorescent dye modulated by nano–heterogeneous micellar systems”, **Photochem. Photobiol. Sci.**, 2016, 15(4), 525–535.
- 42) C. Clementi,* A. Cesaretti, **B. Carlotti** and F. Elisei “The Role of pH in Modulating the Electronic State Properties of Minocycline Drug and Its Inclusion within Micellar Carriers”, **J. Phys. Chem. A**, 2016, 120, 4994–5005.
- 41) **B. Carlotti**,* E. Benassi,* C. G. Fortuna, V. Barone, A. Spalletti and F. Elisei “Efficient Excited–State Symmetry Breaking in a Cationic Quadrupolar System Bearing Diphenylamino Donors”, **ChemPhysChem**, 2016, 17, 136–146.
- 40) G. Cacioppa, **B. Carlotti**, F. Elisei, P. L. Gentili, A. Marrocchi and A. Spalletti* “Unexpected multiple activated steps in the excited state decay of some bis(phenylethynyl)–fluorenes and –anthracenes”, **Phys. Chem. Chem. Phys.**, 2016, 18, 285–294.
- 39) **B. Carlotti**,* E. Benassi,* A. Cesaretti, C. G. Fortuna, A. Spalletti, V. Barone and F. Elisei “An Ultrafast Spectroscopic and Quantum Mechanical Investigation of Multiple Emissions in Push–Pull Pyridinium Derivatives Bearing Different Electron Donors”, **Phys. Chem. Chem.**

Phys., 2015, 17, 20981–20989.

- 38) **B. Carlotti**, F. Elisei, U. Mazzucato and A. Spalletti* “Unusual high fluorescence of two nitro–distyrylbenzene–like compounds induced by CT processes affecting the fluorescence/intersystem–crossing competition”, **Phys. Chem. Chem. Phys.**, 2015, 17, 14740–14749.
- 37) A. Cesaretti, **B. Carlotti**, R. Germani, A. Spalletti and F. Elisei* “Inclusion of push–pull *N*–methylpyridinium salts within surfactant hydrogels: is their excited state intramolecular charge transfer mediated by twisting?”, **Phys. Chem. Chem. Phys.**, 2015, 17, 17214–17220.
- 36) A. Cesaretti, **B. Carlotti**, G. Consiglio, T. Del Giacco, A. Spalletti and F. Elisei* “Inclusion of Two Push–Pull *N*–Methylpyridinium Salts in Anionic Surfactant Solutions: A Comprehensive Photophysical Investigation”, **J. Phys. Chem. B**, 2015, 119 (22), 6658–6667.
- 35) E. Benassi,* **B. Carlotti**,* M. Segado, A. Cesaretti, A. Spalletti, F. Elisei and V. Barone “Presence of Two Emissive Minima in the Lowest Excited State of a Push–Pull Cationic Dye Unequivocally Proved by Femtosecond Up–Conversion Spectroscopy and Vibronic Quantum–Mechanical Computations”, **J. Phys. Chem. B**, 2015, 119 (19), 6035–6040.
- 34) **B. Carlotti**,* E. Benassi,* V. Barone, G. Consiglio, F. Elisei, A. Mazzoli and A. Spalletti “Effect of the π Bridge and Acceptor on Intramolecular Charge Transfer in Push–Pull Cationic Chromophores: An Ultrafast Spectroscopic and TD–DFT Computational Study”, **ChemPhysChem**, 2015, 16 (7), 1440–1450.
- 33) A. Mazzoli, A. Spalletti,* **B. Carlotti**, C. Emiliani, C. G. Fortuna, L. Urbanelli, L. Tarpani, and R. Germani “Spectroscopic Investigation of Interactions of New Potential Anticancer Drugs with DNA and Non–Ionic Micelles”, **J. Phys. Chem. B**, 2015, 119 (4), 1483–1495.
- 32) E. Benassi, **B. Carlotti**, C. G. Fortuna, V. Barone, F. Elisei and A. Spalletti* “Acid–base strength and acidochromism of some dimethylamino–azinium iodides. An integrated experimental and theoretical study”, **J. Phys. Chem. A**, 2015, 119, 323–333.
- 31) **B. Carlotti**, A. Cesaretti, C. G. Fortuna, A. Spalletti and F. Elisei* “Experimental evidence of dual emission in a negatively solvatochromic push–pull pyridinium derivative”, **Phys. Chem. Chem. Phys.**, 2015, 17, 1877–1882.
- 30) N. Basaric, C. Clementi, **B. Carlotti**, M. Aleskovic and F. Elisei* “Photophysics of cyanophenylpyrroles: Investigation of solvatochromic properties and charge transfer by ultrafast spectroscopy and DFT calculations” **J. Photochem. Photobiol. A: Chem.**, 2015, 299, 94–102.
- 29) E. Benassi,* C. Cappelli, **B. Carlotti** and V. Barone “An integrated computational tool to model the broadening of the absorption bands of flexible dyes in solution: cationic chromophores as test cases” **Phys. Chem. Chem. Phys.**, 2014, 16, 26963–26973.
- 28) A. Cesaretti, **B. Carlotti**, P. L. Gentili, C. Clementi, R. Germani and F. Elisei* “Doxycycline and oxytetracycline loading of a zwitterionic amphoteric surfactant–gel and their controlled release” **Phys. Chem. Chem. Phys.**, 2014, 16, 23096–23107.
- 27) A. Cesaretti, **B. Carlotti**, P. L. Gentili, C. Clementi, R. Germani and F. Elisei* “Spectroscopic Investigation of the pH Controlled Inclusion of Doxycycline and Oxytetracycline Antibiotics in Cationic Micelles and Their Magnesium Driven Release” **J. Phys. Chem. B**, 2014, 118, 8601–8613.
- 26) R. Flamini, **B. Carlotti**, A. Spalletti,* and A. Marrocchi “Spectral properties and photophysics of

arylacetylenes in thin films" **Organic Photonics and Photovoltaics**, 2014, 2, 1–11.

- 25) **B. Carlotti**,* E. Benassi,* A. Spalletti, C.G. Fortuna, F. Elisei and V. Barone "Photoinduced symmetry-breaking intramolecular charge transfer in a quadrupolar pyridinium derivative" **Phys. Chem. Chem. Phys.**, 2014, 16, 13984–13994.
- 24) **B. Carlotti**, G. Consiglio, F. Elisei, C.G. Fortuna, U. Mazzucato and A. Spalletti* "Intramolecular charge transfer of push-pull pyridinium salts in the triplet manifold" **J. Phys. Chem. A**, 2014, 118, 7782–7787.
- 23) **B. Carlotti**, G. Consiglio, F. Elisei, C.G. Fortuna, U. Mazzucato and A. Spalletti* "Intramolecular charge transfer of push-pull pyridinium salts in the singlet manifold" **J. Phys. Chem. A**, 2014, 118, 3580–3592.
- 22) A. Mazzoli, **B. Carlotti**, G. Consiglio, C. G. Fortuna, G. Miolo and A. Spalletti* "Photobehaviour of methyl-pyridinium and quinolinium iodide derivatives, free and complexed with DNA. A case of bisintercalation" **Photochem. Photobiol. Sci.**, 2014, 13, 939–950.
- 21) A. Cesaretti, **B. Carlotti**, C. Clementi, R. Germani and F. Elisei* "Effect of micellar and sol-gel media on the spectral and kinetic properties of tetracycline and its complexes with Mg²⁺" **Photochem. Photobiol. Sci.**, 2014, 13, 509–520.
- 20) **B. Carlotti**, I. Kikaš, I. Škorić, A. Spalletti and F. Elisei* "Photophysics of push-pull distyryl furans, thiophenes and pyridynes", **ChemPhysChem**, 2013, 14, 970–981.
- 19) **B. Carlotti**, T. Del Giacco* and F. Elisei "Competition of C–H and C–O fragmentation in substituted *p*-methoxybenzyl ether radical cations generated by photosensitized oxidation" **Photochem. Photobiol. Sci.**, 2013, 12, 489–499.
- 18) **B. Carlotti**, R. Flamini, I. Kikas, U. Mazzucato and A. Spalletti* "Intramolecular charge transfer, solvatochromism and hyperpolarizability of compounds bearing ethenylene or ethynylene bridges", **Chem. Phys.**, 2012, 407, 9–19.
- 17) G. Pizzoli, M. G. Lobello, **B. Carlotti**, F. Elisei, M. K. Nazeeruddin, G. Vitillaro and F. De Angelis* "Acid-base properties of the N3 ruthenium (II) solar cell sensitizer: a combined experimental and computational analysis", **Dalton Trans.**, 2012, 41, 11841–11848.
- 16) I. Kikaš, **B. Carlotti**, I. Škorić, M. Šindler-Kulyk, U. Mazzucato and A. Spalletti* "Synthesis, spectral properties and photobehaviour of push-pull distyrylbenzene nitro-derivatives", **J. Photochem. Photobiol. A**, 2012, 244, 38–46.
- 15) A. Amat,* S. Fantacci,* F. De Angelis, **B. Carlotti** and F. Elisei "DFT/TDDFT investigation of the stepwise deprotonation in tetracycline: pKa assignment and UV-vis spectroscopy", **Theor. Chem. Acc.**, 2012, 131 (5), 1218–1231.
- 14) **B. Carlotti**, R. Flamini, A. Spalletti and F. Elisei* "Comprehensive photophysical behaviour of ethynyl-fluorenes and ethynyl-anthracenes investigated by fast and ultrafast time-resolved spectroscopy" **ChemPhysChem**, 2012, 13 (3), 724–735.
- 13) **B. Carlotti**, A. Cesaretti and F. Elisei* "Complexes of tetracyclines with divalent metal cations investigated by stationary and femtosecond-pulsed techniques" **Phys. Chem. Chem. Phys.**, 2012, 14, 823–834.
- 12) **B. Carlotti**, F. Elisei and A. Spalletti* "A peculiar dependence of intersystem crossing of *p*-nitro-2,5-distyrylfuran on the dielectric properties of the solvent" **Phys. Chem. Chem. Phys.**, 2011, 13, 20787–20793.

- 11) A. Mazzoli, **B. Carlotti**, C. Bonaccorso, C. G. Fortuna, U. Mazzucato, G. Miolo and A. Spalletti* "Photochemistry and DNA-affinity of some pyrimidine-substituted styryl-azinium iodides", **Photochem. Photobiol. Sci.**, 2011, 10, 1830–1836.
- 10) R. Flamini, I. Tomasi, A. Marrocchi, **B. Carlotti** and A. Spalletti* "Synthesis and photobehaviour of donor- π -acceptor conjugated arylacetylenes" **J. Photochem. Photobiol. A: Chemistry**, 2011, 223, 140–148.
- 9) A. Mazzoli, **B. Carlotti**, C. G. Fortuna and A. Spalletti* "Photobehaviour and DNA interaction of styrylquinolinium salts bearing thiophene substituents", **Photochem. Photobiol. Sci.**, 2011, 10, 973–979.
- 8) S. Ciorba, **B. Carlotti**, I. Škorić, M. Šindler-Kulyk and A. Spalletti* "Spectral properties and photobehaviour of 2,5-distyrylfuran derivatives"; **J. Photochem. Photobiol. A: Chemistry** 2011, 219, 1–9.
- 7) **B. Carlotti**, A. Spalletti, M. Šindler-Kulyk and F. Elisei* "Ultrafast photoinduced intramolecular charge transfer in push-pull distyryl furan and benzofuran: solvent and molecular structure effect"; **Phys. Chem. Chem. Phys.**, 2011, 13, 4519–4528.
- 6) T. Del Giacco, **B. Carlotti**, S. De Solis, A. Barbafina and F. Elisei* "Steady-state and time-resolved investigations of a crown thioether conjugated with methylacridinium and its complexes with metal ions"; **Phys. Chem. Chem. Phys.**, 2011, 13, 2188–2195.
- 5) **B. Carlotti**, D. Fuoco and F. Elisei* "Fast and Ultrafast Spectroscopic Investigation of Tetracycline Derivatives in Organic and Aqueous Media"; **Phys. Chem. Chem. Phys.**, 2010, 12, 15580–15591.
- 4) T. Del Giacco, **B. Carlotti**, S. De Solis, A. Barbafina, and F. Elisei* "Photophysics of Aromatic Thiourea Derivatives and their Complexes with Anions. Fast and Ultrafast Spectroscopic Investigations"; **Phys. Chem. Chem. Phys.**, 2010, 12, 8062–8070.
- 3) A. Barbafina, L. Latterini, **B. Carlotti** and F. Elisei* "Characterization of Excited States of Quinones and Identification of Their Deactivation Pathways"; **J. Phys. Chem. A**, 2010, 114 (19), 5980–5984.
- 2) F. Elisei, A. Barbafina, **B. Carlotti** and L. Latterini* "Kinetic and spectroscopic investigation by ultrafast absorption and emission techniques"; **AIP Conference Proceedings** 2007, 963, 615–618.
- 1) L. Latterini,* C. Roscini, **B. Carlotti**, G. G. Aloisi, and F. Elisei "Synthesis and characterization of perylene nanoparticles"; **Phys. Stat. Sol. (a)** 2006, 203 (6), 1470–1475.

Reviewer Activity:

Reviewer for the following international journals: *Nature Communications*, *Accounts of Chemical Research*, *Angewandte Chemie*, *Journal of the American Chemical Society*, *Chemical Science*, *ACS Energy Letters*, *Chemistry of Materials*, *Advanced Optical Materials*, *Advanced Science*, *Small*, *The Journal of Physical Chemistry Letters*, *Chemistry a European Journal*, *The Journal of Physical Chemistry*, *Physical Chemistry Chemical Physics*, *ACS Sustainable Chemistry & Engineering*, *RSC Advances*, *Chemical Physics Letters*, *ChemPhysChem*, *New Journal of Chemistry*, *Photochemical and Photobiological Science*, *Journal of Photochemistry and Photobiology*, *Journal of Luminescence*, *Material Chemistry and Physics*, *International Journal of Analytical Chemistry*, *Spectrochimica Acta*, *Environmental Pollution*.

Editor Activity:

Member of the Editorial Board of *Applied Sciences* (IF 2.5) published by MDPI-Multidisciplinary Digital Publishing Institute.

Associate Editor for *Frontiers in Coatings, Dyes and Interface Engineering* (specialty section *Dyes and Pigments*) published by Frontiers.

Member of the Topical Advisory Panel for *International Journal of Molecular Sciences* (IF 4.9) published by MDPI-Multidisciplinary Digital Publishing Institute.

CONFERENCES:

Scientific/Organizing Committees:

- 6) Member of the Organizing Committee of the **Spring School on Biotechnology 2024** ("Biomaterials and Biodevices in Biotechnology" May 27–30, 2024) in Nocera Umbra, Italy.
- 5) Member of the Organizing Committee of the **Winter School on Biotechnology 2023** ("Biotechnology and Aging" January 23–26, 2023) at the University of Perugia, Italy.
- 4) Member of the Organizing Committee of the **AMIS Day 2022** (Departmental Workshop on the AMIS Research Project December 21, 2022) at the University of Perugia, Italy.
- 3) Member of the Organizing Committee of the **Winter School on Biotechnology 2022** ("Complexity in Biotechnology" January 17–22, 2022) at the University of Perugia, Italy.
- 2) Member of the Organizing Committee of the on-line **Workshop** "Metodi Chimico Fisici utilizzati per lo studio di fasi condensate: informazioni dall'interazione tra fotoni e materiali" (February 24, 2021) organized by the **Division of Physical Chemistry of the Italian Chemical Society**.
- 1) Member of the Organizing Committee of the on-line **Winter School on Biotechnology 2021** ("Biotechnologies in the time of COVID-19" January 18–25, 2021) at the University of Perugia, Italy.

Invited Talks:

- 3) **XXVIII National Congress of the Italian Chemical Society**
Milan, Italy; August 26–30, 2024
"Aggregation Induced Emission: An Insight into the Excited State and Aggregate Formation Mechanism"
- 2) **10th Jubilee Singlet Fission Workshop 2023**
Estes Park, Colorado, USA; June 17–20, 2023
"Singlet Fission in Push-Pull Compounds under the Gaze of Fast and Ultrafast Spectroscopy"
- 1) **International Conference on Photochemistry 2021**
Geneva, Switzerland (Virtual); July 19–23, 2021
"Activating Intramolecular Singlet Exciton Fission by Altering the π -Bridge Connection in Perylene Diimide Trimers and Tetramers for Organic Solar Cells"

Oral Contributions: 12 at National and International Conferences

- 12) **29th IUPAC Symposium on Photochemistry, 2024**
Valencia, Spain; July 14–19, 2024

“Quantum Coherent Energy Transfer in Venus and Ametrine Fluorescent Proteins Under the Gaze of Ultrafast Spectroscopy and Microscopy”

B. Carlotti, C. Rani, H. L. Puhl III, K. Hynes, T. A. Nguyen, S. S. Vogel, T. Goodson

11) 3rd International Symposium on Singlet Fission and Photon Fusion

Milan (MI), Italy; October 10–13, 2022

“A New Class of Singlet Fission Fluorene Derivatives with High-Energy Triplets under the Gaze of Fast and Ultrafast Spectroscopy”

L. Mencaroni, A. Marrocchi, F. Elisei, A. Spalletti, B. Carlotti

10) XXVIII IUPAC Symposium on Photochemistry, 2022

Amsterdam, The Netherlands; July 7–22, 2022

“Aggregation Induced Emission in Phenothiazine Derivatives”

B. Carlotti, T. Bianconi, A. Cesaretti, C. Montanari, P. L. Gentili, R. Misra

9) Italian Photochemistry Meeting 2017

Perugia (PG), Italy; December 14–16, 2017

“Charge Transfer and Aggregation Effects in the Performance of Planar vs Twisted Perylene Diimide Isomers in Organic Solar Cells.”

B. Carlotti, H. Kim, I. K. Madu, Z. Cai, V. Shaparov, P. M. Zimmerman, L. Yu and T. Goodson III

8) XLIV Italian National Conference on Physical Chemistry

Napoli (NA), Italy; September 20–23, 2016

“Photophysical and non-linear optical properties of push-pull, symmetrical and highly fluorescent benzothiadiazole derivatives.”

B. Carlotti, F. Ricci, P. Foggi, F. Elisei, A. Spalletti

7) XXV IUPAC Symposium on Photochemistry, 2014

Bordeaux, France; July 13–18, 2014

“Photoinduced symmetry-breaking intramolecular charge transfer in quadrupolar systems showing positive and negative solvatochromism”

B. Carlotti, V. Barone, E. Benassi, F. Elisei, C. G. Fortuna, A. Spalletti

6) International Conference on Photochemistry, 2013

Leuven, Belgium; July, 21–26, 2013

“Intramolecular charge transfer in the singlet and triplet manifolds of some dipolar and quadrupolar pyridinium salts”

B. Carlotti, A. Cesaretti, C. Fortuna, U. Mazzucato, A. Spalletti, F. Elisei

5) XXIV IUPAC Symposium on Photochemistry, 2012

Coimbra, Portugal; July 15–20, 2012

“Ultrafast photoinduced intramolecular charge transfer in push-pull distyrylfuran, thiophene and pyridine”

B. Carlotti, I. Kikaš, I. Škorić, A. Spalletti, F. Elisei

4) Italian Photochemistry Meeting 2011

Giardini Naxos (ME), Italy; June 10–12, 2011

“Fast and ultrafast photoinduced decay processes of ethynyl-fluorenes and ethynyl-anthracenes”

B. Carlotti, R. Flamini, A. Spalletti, A. Marrocchi, F. Elisei

3) XXXIX Italian National Conference on Physical Chemistry

Stresa (VB), Italy; September 20–24, 2010

"Dynamics of the lowest excited singlet states of nitro- aromatics investigated by time-resolved techniques"

B. Carloti, F. Elisei, A. Spalletti

2) **XXXVI Italian National Conference on Physical Chemistry**

Gallipoli (LE), Italy; June 17–22, 2007

"AFM force curve investigation of DNA elasticity"

B. Carloti, F. Elisei, L. Latterini, L. A. Bottomley, N. V. Hud, C. T. Santai.

1) **SERMACS (The Southeastern Regional Meeting of the American Chemical Society)**

Augusta (GA), USA; November 1–4, 2006

"Does the elasticity of DNA depend upon its orientation?"

B. Carloti, C. T. Santai, N. V. Hud, L. A. Bottomley.

Posters: 36 at National and International Conferences

TEACHING EXPERIENCE:

- Teaching Assistant for the "Physical Chemistry" class of the Pharmaceutical Chemistry and Technology degree of the University of Perugia (2007).
- Teaching of a course about "Innovation in textile fibres and yarns" within a project of professional formation in the textile sector (2008 and 2011).
- Teaching Assistant for the "Physical Chemistry Lab 2" of the Bachelor degree in Chemistry of the University of Perugia (2010–2014).
- Teaching of a course of "Environmental Chemistry" for the "Attività di Protezione Civile" Bachelor degree of the University of Perugia (2011 and 2012).
- Teaching of a course of "Femtochemistry" for the Master degree in Chemistry of the University of Perugia (2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022 and 2023).
- Teaching of a course of "Instrumental Analytical Chemistry Lab" for the Bachelor degree in Chemistry of the University of Perugia (2019).
- Teaching of a course of "Physical Chemistry Lab 2" for the Bachelor degree in Chemistry of the University of Perugia (2018, 2021, 2022 and 2023).
- Teaching of a course of "Biosensors and Biomaterials" for the Bachelor degree in Biotechnology of the University of Perugia (2019, 2020, 2021, 2022 and 2023).
- Teaching of a course of "Femtobiology" for the PhD in Biotechnology of the University of Perugia (2020, 2021, 2022, 2023 and 2024).
- Member of the jury for the title of "Docteur en Sciences Naturelles, mention chimie" (PhD in Natural Science, Chemistry) at the University of Geneva, Switzerland (April 2015).
- Member of the jury for the Ugo Mazzucato prize for the best PhD Thesis in Photochemistry awarded by the Italian Photochemistry Group (since August 2021).
- Visiting professor of "Photochemistry and Spectroscopy" at the University of Coimbra, Portugal (2015).
- Visiting professor of "Femtochemistry" at the Aarhus University, Denmark (2016).
- Visiting Professor of "Femtochemistry" at the University of Bordeaux, France (2019).
- Member of the Faculty Board for the "PhD in Biotechnology" of the University of Perugia (since March 2019) and for the "PhD in Photoinduced Processes and Technologies" of National Interest (since July 2022).

- Responsible for the Quality of the degree in Biotechnology of the University of Perugia (since June 2022) and of the “PhD in Photoinduced Processes and Technologies” of National Interest (since March 2023).
- Research advisor of several bachelor and master students: Alessandra Mazzoli (Degree in Chemistry, 2008), Alessio Cesaretti (Degree in Chemistry, 2009), Laura Paparelli (Degree in Biotechnology, 2009), Domenico Fuoco (PhD in Chemistry, 2010), Francesco Lampredi (Degree in Biotechnology, 2010), Alessandra Mazzoli (Master Degree in Chemistry, 2010), Matteo Massini Rosati (Degree in Biotechnology, 2010), Giuliano Pizzoli (Master Degree in Chemistry, 2011), Alessio Cesaretti (Master Degree in Chemistry, 2011), Laura Paparelli (Master Degree in Biotechnology, 2012), Serena Vannucci (Master Degree in Chemistry, 2013), Giulia Cacioppa (Degree in Chemistry, 2013), Fiamma Galletti (Degree in Chemistry, 2014), Francesco Lampredi (Master Degree in Biotechnology, 2014), Federica Ricci (Degree in Chemistry, 2014), Simona Fontanella (Master Degree in Biotechnology, 2014), Serena Paoletti (Degree in Chemistry, 2015), Giulia Cacioppa (Master Degree in Chemistry, 2015), Davide Delli Campi (Degree in Chemistry, 2015), Maddalena Elia (Degree in Biotechnology, 2016), Leonardo Tarlati (Degree in Chemistry, 2016), Federica Ricci (Master Degree in Chemistry, 2016), Fiamma Galletti (Master Degree in Chemistry, 2017), Irene Golembo (Degree in Biotechnology, 2017), Davide Delli Campi (Master Degree in Chemistry, 2017), Letizia Mencaroni (Master Degree in Chemistry, 2019), Elena Ferraguzzi (Master Degree in Chemistry, 2020), Chiara Montanari (Degree in Chemistry, 2020), Erika Pasciucco (Degree in Chemistry, 2020), Martina Alebardi (Degree in Chemistry, 2020), Giulia Pantella (Degree in Biotechnology, 2020), Antonio Lattanzi (Degree in Biotechnology, 2020), Mariafrancesca Coccimiglio (Master Degree in Chemistry, 2021), Maria Aurora Mancuso (Master Degree in Chemistry, 2021), Alessandro Armadoro (Degree in Chemistry, 2021), Pietro Mancini (Degree in Biotechnology, 2022), Gianmarco Reali (Degree in Biotechnology, 2022), Alessia Ciaramelletti (Degree in Biotechnology, 2022), Renato Allegrezza (Degree in Biotechnology, 2022), Chiara Montanari (Master Degree in Chemistry, 2022), Martina Alebardi (Master Degree in Chemistry, 2022), Cesare Boriosi (Degree in Chemistry, 2022), Roberto Cantoni (Degree in Chemistry, 2022), Antonietta Garofalo (Degree in Biotechnology, 2022), Enrico Sorbelli (Master Degree in Chemistry, 2023), Giulia Cavalletti (Degree in Chemistry, 2023), Simone Carlini (Degree in Biotechnology, 2023), Badr Arsalan (Degree in Biotechnology, 2023), Diego Nicodemo (Degree in Biotechnology, 2023), Alessandro Ricci (Master Degree in Chemistry, 2023), Elisa Giusti (Degree in Biotechnology, 2024), Lorenzo Masci (Degree in Biotechnology, 2024), Costanza Morosi (Degree in Biotechnology, 2024), Pietro Mancini (Master Degree in Biotechnology, 2024), Roberto Cantoni (Master Degree in Chemistry, 2024).
- Research advisor of PhD students: Tommaso Bianconi (PhD in Biotechnology, 2020-2023), Chiara Montanari (PhD in Biotechnology, 2022-2025), Martina Alebardi (PhD in Photoinduced Processes and Technologies, 2022-2025), Pietro Mancini (PhD in Biotechnology, 2024-2027), Roberto Cantoni (PhD in Chemical Sciences, 2024-2027).
- Research advisor of Post-Doc researchers: Enrico Sorbelli (2024-2025).

September 2024