

Dr Raffaella Buonsanti

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EDUCATION

- 2006 - 2010 PhD in Nanoscience, University of Salento, Italy.
adviser: Prof. P.D. Cozzoli
- 2000 – 2006 Master degree in Chemistry, University of Bari, Italy
advisors: Prof. P.D. Cozzoli and Prof. A. Agostiano

ACADEMIC POSITIONS

- 2022 – present Associate Professor, EPFL
- 2015 – 2022 Tenure-track Assistant Professor, EPFL
- 2013 – 2015 Tenure-track Staff Scientist at the Joint Center for Artificial Photosynthesis, Materials Science Department, Lawrence Berkeley National Laboratory
- 2012 – 2013 Project Scientist at the Molecular Foundry, Materials Science Department, Lawrence Berkeley National Laboratory
- 2010 – 2012 Postdoctoral Researcher at the Molecular Foundry, Materials Science Department, Lawrence Berkeley National Laboratory
adviser: Prof. Delia Milliron

PUBLICATION LIST

As of March 2025, Professor Raffaella Buonsanti has co-authored a total of **133 peer-review publications** in international journals, 42 as a PhD and Postdoctoral researcher and **91 during her independent career**. These publications have received over 12000 literature citations and an **h-index of 55**.

The full list of publications can be found here:

<https://scholar.google.ch/citations?user=cWUMss8AAAAJ&hl=en&oi=ao>

The 1st and 4th most cited publications have been published during independent career

138. P.P. Albertini, J. Calderon Mora, M. Guskova, P. Rodlamul, N. Hicks, J. Leemans, A. Loiudice, R. Buonsanti "Active sites under electronic effect are more sensitive to micro-environment in CO₂ electroreduction" *submitted* (link, green open access here)

137. C. Boulanger, D. Arenas Esteban, K. Kumar, J. Leemans, P. P. Albertini, H. You, E. Assendjee, D. C. Stoian, S. Bals, R. Buonsanti "A Colloidal Nanofoundry for Catalytically Active Solid-Liquid-Solid Nanoparticles" *submitted* (<https://www.researchsquare.com/article/rs-5363297/v1>)
136. M. Wang, A. Loiudice, E. Ibanez Ale, K. Kumar, D. Stoian, Z. Lian, P. P. Albertini, L. Zaza, J. Leemans, N. Lopez, R. Buonsanti "Colloidal copper nanospheres boost propanol electrosynthesis from CO" *submitted* (<https://www.researchsquare.com/article/rs-4544481/v1>)
135. J. Kok, P. P. Albertini, J. Leemans, R. Buonsanti*, T. Burdyny* "Overcoming Copper Stability Challenges in CO₂ Electrolysis" *submitted*
134. J. Leemans, Jennifer Calderon Mora, P. P. Albertini, K. Kumar, C. Boulanger, R. Buonsanti "The chemical nature of the oxide directs the stability and reactivity of copper|oxide interfaces in the electrochemical CO₂ reduction reaction" *submitted*
133. R. Buonsanti, B. Cossairt "The future of colloidal semiconductor nanocrystals" *Chem. Mater.* **2025**, 37, 1333. This article is an invited Editorial.
132. L. Zaza, B. Rankovic, P. Schwaller, R. Buonsanti "A holistic data-driven approach to synthesis predictions of colloidal nanocrystal shapes" *J. Am. Chem. Soc.* **2025**, 147, 6116.
131. L. Zaza, D. C. Stoian, N. Bussel, P. P. Albertini, C. Boulanger, J. Leemans, K. Kumar, A. Loiudice, R. Buonsanti* "Increasing precursor reactivity enables continuous tunability of copper nanocrystals from single crystalline to twinned and stacking fault-lined" *J. Am. Chem. Soc.* **2024**, 146, 32766
130. P. B. Green, O. Segura Lecina, P. P. Albertini, M. A. Newton, K. Kumar, C. Boulanger, J. Leemans, P. Thompson, A. Loiudice, R. Buonsanti* "Colloidal atomic layer deposition on nanocrystals using ligand-modified precursors" *J. Am. Chem. Soc.* **2024**, 146, 10708
129. V. Lapointe, P. B. Green, A. N. Chen, R. Buonsanti, M. B. Majewski "Long lived CsPbBr₃ superlattices: colloidal atomic layer deposition for structural stability" *Chem. Sci.* **2024**, 15, 4510
128. P. P. Albertini, M. A. Newton, M. Wang, O. Segura Lecina, P. B. Green, D. C. Stoian, E. Oveisi, A. Loiudice, R. Buonsanti* "Hybrid Oxide Coatings Generate Stable Cu Catalysts for CO₂ Electroreduction" *Nature Mater.* **2024**, 23, 680-687
127. J. Vavra, G. P. L. Ramona, F. Dattila, A. Kormányos, T. Priamushko, P. P. Albertini, A. Loiudice, S. Cherevko, N. López, R. Buonsanti* "Solution-based Cu⁺ transient species mediate the reconstruction of copper electrocatalysts for CO₂ reduction" *Nature Catal.* **2024**, 7, 89
126. O. Segura Lecina, M. Newton, P. B. Green, P. P. Albertini, J. Leemans, K. P. Marshall, D. Stoian, A. Loiudice, R. Buonsanti* "Surface chemistry dictates the enhancement of luminescence and stability of InP QDs upon c-ALD ZnO hybrid shell growth" *JACS Au* **2023**, 11, 3066
125. V. Okatenko, C. Boulanger, A. N. Chen, K. Kumar, P. Schouwink, A. Loiudice, R. Buonsanti* "Voltage-driven Chemical Reactions Enable the Synthesis of Tunable Liquid Ga – Metal Nanoparticles" *J. Am. Chem. Soc.* **2023**, 145, 25401
124. P. B. Green, O. Segura Lecina, P. Albertini, A. Loiudice, R. Buonsanti* "Colloidal-ALD Grown Metal Oxide Shells Enable the Synthesis of Photoactive Ligand/Nanocrystal Composite Materials" *J. Am. Chem. Soc.* **2023**, 145, 8189.
123. V. Okatenko, A. Loiudice, M. A. Newton, D. C. Stoian, A. Blokhina, A. N. Chen, K. Rossi, R. Buonsanti* "Alloying as a Strategy to Boost the Stability of Copper Nanocatalysts during the Electrochemical CO₂ Reduction Reaction" *J. Am. Chem. Soc.* **2023**, 145, 5370

- 122. R. Buonsanti*** "Electronic Lab Notebooks for Materials Synthesis" *Chem. Mater.* **2023**, 35, 805. *Invited Contribution*.
- 121.** M. Wang, A. Loiudice, V. Okatenko, I.D. Sharp, A. Llobet, **R. Buonsanti*** "The spatial distribution of cobalt phthalocyanine and copper nanocubes controls the selectivity towards C₂ products in tandem electrocatalytic CO₂ reduction", *Chem. Sci.* **2023**, 14, 1097
- 120.** M. Wang, V. Nikolaou, A. Loiudice, I.D. Sharp, A. Llobet, **R. Buonsanti*** "Tandem electrocatalytic CO₂ reduction with Fe-porphyrins and Cu nanocubes enhances ethylene production", *Chem. Sci.* **2022**, 13, 12673
- 119.** L. Castilla-Amorós, P. Schouwink, E. Oveisi, **R. Buonsanti*** "Tailoring Morphology and Elemental Distribution of CuIn Nanocrystals via Galvanic Replacement", *J. Am. Chem. Soc.* **2022**, 144, 18286.
- 118.** J. R. Pankhurst, L. Castilla-Amorós, D. Stoian, J. Vavra, V. Mantella, P. P. Albertini, **R. Buonsanti*** "Copper-Phosphonate Lamella Intermediates Control the Shape of Colloidal Copper Nanocrystals" *J. Am. Chem. Soc.* **2022**, 144, 12261.
- 117.** V. Okatenko, L. Castilla-Amorós, D. Stoian, J. Vavra, A. Loiudice, **R. Buonsanti*** "The native oxide skin of liquid metal Ga nanoparticles prevents their rapid coalescence during electrocatalysis" *J. Am. Chem. Soc.* **2022**, 144, 1053.
- 115.** A. Loiudice, **R. Buonsanti*** "Reaction Intermediates in the Synthesis of Colloidal Nanocrystals" *Nature Synthesis* **2022**, 1, 334. *Invited Contribution*.
- 114.** L. Zaza, K. Rossi, **R. Buonsanti*** "Well-Defined Copper-Based Nanocatalysts for Selective Electrochemical Reduction of CO₂ to C₂ products" *ACS Energy Lett* **2022**, 7, 1284
- 113.** O. Segura Lecina, M. Hope, A. Venkatesh, S. Björgvinsdóttir, K. Rossi, A. Loiudice, L. Emsley, **R. Buonsanti*** "Colloidal-ALD Grown Hybrid Shells Nucleate via a Ligand–Precursor Complex" *J. Am. Chem. Soc.* **2022**, 144, 3998
- 112.** K. Rossi, **R. Buonsanti*** "Shaping Copper Nanocatalysts to Steer Selectivity in the Electrochemical CO₂ Reduction Reaction" *Acc. Chem. Res.* **2022**, 55, 629. *Invited Contribution*.
- 111.** G.O. Larrazábal, V. Okatenko, I. Chorkendorff, **R. Buonsanti**, B. Seger* "An investigation of ethylene and propylene production from CO₂ reduction over copper nanocubes in MEA-type electrolyzer" *ACS Appl. Mater. Interf.* **2022**, 14, 779
- 110.** L. Castilla-Amoros, T.-C. Chang Chien, J. R. Pankhurst, **R. Buonsanti*** "Modulating the Reactivity of Liquid Ga Nanoparticle Inks by Modifying their Surface Chemistry" *J. Am. Chem. Soc.* **2022**, 144, 1993
- 107.** A. Loiudice, B.P.G. Niau, **R. Buonsanti*** "Crystal phase control of ternary metal oxides by solid-state synthesis with nanocrystals" *ACS Nanoscale Au* **2022**, 2, 233. *Invited Contribution*.
- 106.** A. Loiudice, A. Segura Lecina, A. Bornet, J. Luther, **R. Buonsanti*** "Ligand locking on quantum dot surfaces via a mild reactive surface treatment" *J. Am. Chem. Soc.* **2021**, 143, 13418
- 105.** S.B. Varandili, D. Stoian, J. Vavra, K. Rossi, J. R. Pankhurst, Y. Guntern, N. Lopez, **R. Buonsanti*** "Elucidating the structure-dependent selectivity towards methane and ethanol of CuZn in the CO₂ electroreduction using tailored Cu/ZnO precatalysts" *Chem. Sci.* **2021**, 12, 14484.
- 104.** P. Iyengar, M. J. Kolb, J. Pankhurst, F. Calle Vallejo*, **R. Buonsanti*** "Elucidating the Facet-dependent Selectivity for CO₂ Electroreduction to Ethanol of Cu-Ag Tandem Catalysts" *ACS Catalysis* **2021**, 11, 13330.

103. S.W. Sheehan and **R. Buonsanti*** "Deriving value from CO₂: From catalyst design to industrial implementation" *Chem. Catalysis* **2021**, 1, 751.
102. **R. Buonsanti** and S.W. Sheehan "Catalyst discovery for electrochemical CO₂ conversion" *Chem. Catalysis* **2021**, 1, 754.
101. **R. Buonsanti*** "Copper, my precious!" *Nature Catalysis* **2021**, 4, 736 *Invited Contribution*.
100. A. Loiudice, A. Segura Lecina, A. Bornet, J. Luther, **R. Buonsanti*** "Ligand locking on quantum dot surfaces via a mild reactive surface treatment" *J. Am. Chem. Soc.* **2021**, 143, 13418
99. **R. Buonsanti*** "Developing the Chemistry of Colloidal Cu Nanocrystals to Advance the CO₂ Electrochemical Reduction" *Chimia* **2021**, 75, 598 *Invited Contribution*.
98. **R. Buonsanti*** and W. Smith* "Emerging collaborations at the forefront of growth in electrochemical synthesis" *iScience* **2021**, 24, 102639 *Invited Contribution*.
97. **R. Buonsanti*** and N. Zheng* "The Inorganic Chemistry of Nanoparticles" *Inorg. Chem.* **2021**, 60, 4179. *Editorial for Guest Editor issue*
96. P. Iyengar, M. Kolb, J. Pankhurst, F. Calle Vallejo, **R. Buonsanti*** "Elucidating the Facet-dependent Selectivity for CO₂ Electroreduction to Ethanol of Cu-Ag Tandem Catalysts" *ACS Catalysis* **2021**, 11, 4456
95. Y. Guntern, J. Vavra, V. Karve, S. Varandili, O. Segura Lecina, C. Gadiyar, **R. Buonsanti*** "Synthetic Tunability of Colloidal Covalent Organic Framework/Nanocrystal Hybrids" *Chem. Mater.* **2021**, 33, 2646.
94. J. Pankhurst, P. Iyengar, V. Okatenko, **R. Buonsanti*** "Copper nanocrystal morphology determines the viability of molecular surface functionalization in tuning electrocatalytic behavior in CO₂ reduction", *Inorg. Chem.* **2021**, 60, 6939
93. **R. Buonsanti***, A. Loiudice, V. Mantella "Colloidal Nanocrystals as Precursors and Intermediates in Solid State Reactions for Multinary Oxide Nanomaterials" *Acc. Chem. Res.* **2021**, 54, 754. *Invited Contribution*.
92. Y.T. Guntern, V. Okatenko, J. Pankhurst, S.B. Varandili, P. Iyengar, C. Koolen, D. Stoian, J. Vavra, **R. Buonsanti***, Colloidal Nanocrystals as Electrocatalysts with Tunable Activity and Selectivity, *ACS Catal.* **2021**, 11, 1248. *Invited Contribution*.
91. **R. Buonsanti*** "Magic clusters are better together" *Nature Mater.* **2021**, 20, 580. *Invited contribution*
90. V. Mantella, S.B. Varandili, J. R. Pankhurst, **R. Buonsanti*** "Colloidal synthesis of Cu-M-S (M=V, Cr, Mn) nanocrystals by tuning the copper precursor reactivity" *Chem. Mater.* **2020**, 32, 9780
89. S.B. Varandili, D. Stoian, Jan Vavra, J. R. Pankhurst, **R. Buonsanti*** "Ligand-mediated formation of Cu/metal oxide hybrid nanocrystals with tunable number of interfaces " *Chem. Sci.* **2020**, 11, 13094
88. L. Castilla-Amoros, D. Stoian, J. R. Pankhurst, S.B. Varandili, **R. Buonsanti*** "Exploring the chemical reactivity of gallium liquid metal nanoparticles in galvanic replacement" *J. Am. Chem. Soc.* **2020**, 142, 19283
87. J. Vavra, T.-H. Shen, D. Stoian, V. Tileli*, **R. Buonsanti*** "Real-time monitoring reveals dissolution/redeposition mechanism in Cu nanocatalysts during the initial stages of the CO₂ reduction reaction " *Angew. Chemie. Int. Ed.* **2020**, 59, 2 (highlighted in *Nature Catalysis* [link](#))
86. C. Gadiyar, A. Loiudice, F. D'Ambra, E. Oveisi, D. Stoian, P. Iyengar, L. Castilla-Amoros, V. Mantella, **R. Buonsanti*** "Nanocrystals as precursors in solid state reactions for size- and shape- controlled polyelemental nanomaterials" *J. Am. Chem. Soc.* **2020**, 142, 15931

85. J.R. Pankhurst, P. Iyengar, A. Loiudice, M. Mensi, **R. Buonsanti*** "Metal-ligand bond strength determines the fate of organic ligands on the catalyst surface during the electrochemical CO₂ reduction reaction" *Chem. Sci.* **2020**, 11,929
84. V. Mantella, M. Strach, K. Frank, J.R. Pankhurst, D. Stoian, C. Gadiyar, B. Nickel, **R. Buonsanti*** "Polymer Lamellae as Reaction Intermediates of Cu Nanospheres Evidenced by In-situ-X-ray Studies" *Angew. Chemie. Int. Ed.* **2020**, 59, 11627.
83. S. Sarys, S. Dona, V. Niemann, A. Loiudice, **R. Buonsanti*** "Optimizing the Atomic Layer Deposition of Alumina on Perovskite Nanocrystals Films by Using O₂ as a Molecular Probe" *Helv. Chim. Acta* **2020**, 103, e2000055.
82. S. Ninova, M. Strach, **R. Buonsanti**, U. Aschauer*, Suitability of Cu-substituted β -Mn₂V₂O₇ and Mn-substituted β -Cu₂V₂O₇ for photocatalytic water splitting, *J. Chem. Phys.* **2020**, 153, 2020.
81. A. Loiudice, S. Saris, **R. Buonsanti*** "A Tunable Metal Oxide Shell as a Spacer to Study Energy Transfer in Semiconductor Nanocrystals" *J. Phys. Chem. Lett.* **2020**, 2020, 11, 3430
80. G. De Gregorio, T. Burdyny, A. Loiudice, P. Iyengar, W. Smith, **R. Buonsanti*** "Facet-dependent selectivity of Cu catalysts in electrochemical CO₂ reduction at commercially viable current densities", *ACS Catalysis* **2020**, 10, 4854. (ACS Editors Choice).
79. S. Saris, A. Loiudice, M. Mensi, **R. Buonsanti*** "Exploring Energy Transfer in a Metal/Perovskite Nanocrystal Antenna to Drive Photocatalysis" *J. Phys. Chem. Lett.* **2019**, 10, 7797.
78. S. Sarys, V. Niemann, V. Mantella, A. Loiudice, **R. Buonsanti*** "Understanding the mechanism of metal-induced degradation in perovskite nanocrystals" *Nanoscale* **2019**, 11, 19543
77. M. Strach, V. Mantella, J.R. Pankhurst, P. Iyengar, A. Loiudice, S. Das, C. Corminboeuf, W. van Beek, **R. Buonsanti*** "Insights into reaction intermediates to predict synthetic pathways for shape-controlled metal nanocrystals" *J. Am. Chem. Soc.* **2019**, 141, 16312
76. J.R. Pankhurst, Y.T. Guntern, M. Mensi, **R. Buonsanti*** "Molecular tunability of surface-functionalized metal nanocrystals for selective electrochemical CO₂ reduction" *Chem. Sci.* **2019**, 10, 10356
75. G. Mangione, J. Huang, **R. Buonsanti**, C. Corminboeuf* "Dual-facet mechanism in copper nanocubes for electrochemical CO₂ reduction to ethylene" *J. Phys. Chem. Lett.* **2019**, 10, 4259
74. Y.T. Guntern, J.R. Pankhurst, J. Vávra, M. Mensi, V. Mantella, P. Schouwink, **R. Buonsanti***, Nanocrystal/Metal-Organic Framework Hybrids as Electrocatalytic Platforms for CO₂ Conversion, *Angew. Chemie. Int. Ed.* **2019**, 58, 2.
73. A. Loiudice, M. Strach, S. Saris, D. Chernyshov, **R. Buonsanti***, Universal Oxide Shell Growth Enables In-situ Structural Studies of Perovskite Nanocrystals during the Anion Exchange Reaction, *J. Am. Chem. Soc.* **2019**, 141, 8254.
72. P. Iyengar J. Huang, G.L. De Gregorio, C. Gadiyar, **R. Buonsanti***, Size-dependent selectivity of Cu nano-octahedra catalysts for the electrochemical CO₂ reduction to CH₄, *Chem. Commun.* **2019**, 55, 8796.
71. S. B. Varandili, J. Huang, E. Oveisi, G.L. De Gregorio, M. Mensi, M. Strach, J. Vavra, C. Gadiyar, A. Bhowmik, **R. Buonsanti***, Synthesis of Cu/CeO_{2-x} heterodimers with interfacial active sites to promote CO₂ electroreduction, *ACS Catalysis* **2019**, 9, 5035
70. J. Huang, M. Mounir, E. Oveisi, V. Mantella, **R. Buonsanti***, Structural sensitivities in bimetallic catalysts for electrochemical CO₂ reduction revealed by Ag-Cu nanodimers, *J. Am. Chem. Soc.* **2019**, 141, 2490.
69. V. Mantella, S. Ninova, S. Saris, A. Loiudice, U. Aschauer, **R. Buonsanti***, Synthesis and size-dependent optical properties of intermediate band gap Cu₃VS₄ nanocrystals, *Chem. Mater.* **2019**, 31, 532.
68. M. Scarongella, C. Gadiyar, M. Strach, L. Rimoldi, A. Loiudice, **R. Buonsanti***, Assembly of β -Cu₂V₂O₇/WO₃ nanocomposites and the impact of their composition on structure and photoelectrochemical properties, *J. Mater. Chem. C.* **2018**, 6, 1262.

67. J. Wiktor, I. Reshetnyak, M. Strach, M. Scarongella, R. Buonsanti, A. Pasquarello, Sizable excitonic effects undermining the photocatalytic efficiency of β - $\text{Cu}_2\text{V}_2\text{O}_7$, *J. Phys. Chem. Lett.* **2018**, 9, 5698.
66. J. Huang, N. Hörmann, E. Oveisi, A. Loiudice, G. De Gregorio, O. Andreussi, N. Marzari, R. Buonsanti*, Potential-induced nanoclustering of metallic catalysts during electrochemical CO_2 reduction, *Nature Comm.* **2018**, 9, 3117.
65. C. Gadiyar, M. Strach, P. Schouwink, A. Loiudice, R. Buonsanti*, Chemical transformations at the nanoscale: nanocrystal-seeded synthesis of β - $\text{Cu}_2\text{V}_2\text{O}_7$ with enhanced photoconversion efficiencies, *Chem. Sci.* **2018**, 9, 5658.
64. W. Luo, W. Xie, R. Mutschler, E. Oveisi, G. L. De Gregorio, R. Buonsanti, A. Züttel "Selective and stable electroreduction of CO_2 to CO at the copper/indium interface" *ACS Catal.* **2018**, 8, 6571.
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62. R. Sharma, A. M. Sawvel, B. Barton, A. Dong, R. Buonsanti, A. Llodes, E. Schaible, S. Axnanda, Z. Liu, J. J. Urban, D. Nordlund, C. Kisielowski, D. J. Milliron "Modulation of Carrier Type in Nanocrystal-in-Matrix Composites by Interfacial Doping" *Chem. Mater.* **2018**, 30, 2544.
61. A. Loiudice, S. Saris, E. Oveisi, D.T.L. Alexander, R. Buonsanti*, CsPbBr_3 QD/ AlOx inorganic nanocomposites with exceptional stability in water, light and heat. *Angew. Chem. Int. Ed.* **2017**, 56, 10696.
60. L. H. Hess, J.K. Cooper, A. Loiudice, C.-M. Jiang, R. Buonsanti*, I.D. Sharp*, Probing interfacial energetics and charge transfer kinetics in semiconductor nanocomposites: New insights into heterostructured $\text{TiO}_2/\text{BiVO}_4$ photoanodes, *Nano Energy* **2017**, 34, 375.
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57. A. Loiudice, J.K. Cooper, Lucas H. Hess, T.M. Mattox, I.D. Sharp*, R. Buonsanti*, "Assembly and photocarrier dynamics of heterostructured nanocomposite photoanodes from multicomponent colloidal nanocrystals" *Nano. Lett.* **2015**, 15, 7347.
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54. R. Buonsanti*, A. Loiudice, V. Mantella "Colloidal Nanocrystals as Precursors and Intermediates in Solid State Reactions for Multinary Oxide Nanomaterials" *Acc. Chem. Res.* **2021**, doi.org/10.1021/acs.accounts.0c00698 (Special Issue "Transformative Inorganic Nanocrystals")
53. Y.T. Guntern, V. Okatenko, J. Pankhurst, S.B. Varandili, P. Iyengar, C. Koolen, D. Stoian, J. Vavra, R. Buonsanti*, Colloidal Nanocrystals as Electrocatalysts with Tunable Activity and Selectivity, *ACS Catal.* **2021**, 11, 1248.
52. R. Buonsanti* "Magic clusters are better together" *Nature Mater.* **2021**, doi.org/10.1038/s41563-020-00910-3 (News and Views)
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47. R. Buonsanti*, A solid advance in electrolytes, *Nature Energy* **2019**, 4, 728 (News and Views)
46. J. Huang, R. Buonsanti*, Colloidal nanocrystals as heterogeneous catalysts for electrochemical CO₂ conversion, *Chem. Mater.* **2019**, 31, 13 (Up and Coming Perspective, *ACS Editors Choice*).
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2.3. During Postdoc and PhD:

42. S.M. Meckler, C. Li, W. L. Queen, T. E. Williams, J. R. Long, R. Buonsanti, D. J. Milliron, and B. A. Helms, Sub-micron Polymer–Zeolitic Imidazolate Framework Layered Hybrids via Controlled Chemical Transformation of Naked ZnO Nanocrystal Films, *Chem. Mater.* **2015**, 27, 7673.
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40. R. Sharma, A. Sawvel1, B. Barton, A. Dong, R. Buonsanti, S. Axnanda, Z. Liu, J. J. Urban, D. Nordlund, C. Kisielowski, D. J. Milliron, Modulation of carrier type by interface doping in ultrathin semiconductor nanocrystal-in-matrix composites, *Chem. Mater.* **2015**, 27, 2755.
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1. R. Buonsanti, V. Grillo, E. Carlino, C. Giannini, M. L. Curri, C. Innocenti, C. Sangregorio, K. Achterhold, F. G. Parak, A. Agostiano, P. D. Cozzoli, "Seeded Growth of Asymmetric Binary Nanocrystals Made of a Semiconductor TiO₂ Rodlike Section and a Magnetic γ -Fe₂O₃ Spherical Domain" *J. Am. Chem. Soc.* **2006**, 128, 16953.

INVITED LECTURES since at EPFL**Post tenure****Conferences:**

NWO Chains (main chemistry conference in the Netherlands), plenary speaker, Eindhoven, December 2-4, **2024**

Nature Conference, CO₂ conversion by renewable energy, Wuhan, November 8-10, **2024**

ACS Fall Meeting 2024 (4 different invited talks in 4 different divisions of ACS), Denver, August 18-22, **2024**

ACS Fall Meeting 2023 (invited talk in ACS Inorganic Division for 65 years birthday celebration), San Francisco, August 13-17 **2023**;

EuropaCat, <https://www.europacat2023.cz/>, Prague, August 27 -September 1 **2023**

Nanax 10, Nanoscience with nanocrystals <http://nanax.org/>, Klosterneuburg, Austria, 3-7 July **2023**

Argonne National Laboratory User Meeting, Chicago **2023**, joined virtually (<https://www.anl.gov/cnm/apscnm-users-meetings>)

International Conference on Clean Energy for Carbon Neutrality, Hong Kong **2023**, joined virtually (<https://www.cityu.edu.hk/hkice/iccecn2023/program03.html>)

MatSus2023, symposia “Chemistry of Materials” and “Electrocatalysis for the Production of Fuels and Chemicals”, Valencia **2023**

MRS Fall Symposium “Challenges and opportunities in solution synthesis of functional nanomaterials”, Boston, **2022**

Grk Nanohybrid Conference, Hamburg, **2022**

Sol-Gel Conference, Lyon, **2022**

Royal Spanish Chemical Society Biannual Meeting, Granada, **2022**

GRC Renewable Energy: Solar Fuels, Tuscany, **2022**

Spring ACS, ACS Division of Inorganic Chemistry, 65th symposium, **2022**

Schools and Workshops:

ECOFuel Workshop, virtual, November 28th, **2023**;

12th De Nora Symposium, Milan, November 7-8 **2023**;

UK-Swiss Bilateral Meeting on Net Zero organized by Royal Chemical Society and Swiss Chemical Society, 15-16 June **2023**, London

International Sol-Gel Society's eSeminar series_May **2023**

iCANX Talks, Vol. 132, **2023**: <https://www.ican-x.com/icanx-talks>

International Symposium on Photo & Electro Catalytic CO₂ Reduction_Nankai University, September **2022**

International Symposium on Photo & Electro Catalytic CO₂ Reduction_Nankai University, November **2021** (online, [link](#))

ICFO-Univ of Toronto-PFL-Stanford International School Photons for Green Energy, October **2021** (online)

Department seminars:**2024:**

Seminar for Samsung Advanced Institute of Technology, virtual
Department of Chemistry, Queen's University, Kingston, Canada
Department of Chemistry, University of Toronto, Canada;
Seminar at Max-Planck Institute for Kohelenforschung (KOFO), Mullheim, Germany

2023:

UC Berkeley, Kavli Energy NanoScience Institute
Max-Planck-Institut für Kohlenforschung, Mulheim;
Department of Chemistry, Jilian University (online);
Department of Chemistry, Imperial College;
Department of Chemistry, Cambridge;
Department of Chemistry (plenary at the KAVLI Energy Nanoscience Institute), UC Berkeley

2022:

Department of chemistry, PChem Seminar, LMU;
Max Planck Institute (MPI) for Dynamics of Complex Technical Systems;
Department of Chemistry (Inorg Chem Seminar), MIT

At tenure application**Conferences:**

MRS Fall, Symposium “Electrocatalytic Materials to Sustainably Convert Atmospheric C, H, O, and N into Fuels and Chemicals”, Boston, **2021**,
SOLGEL2021, Lyon
NanoGe Fall Meeting, Syposium #SolCat21, **2021**
ACS Spring Virtual Meeting in Symposia CATL-“Well-Defined Materials for Heterogeneous Catalysis: Synthesis, Characterization, and Performance Studies” and COLL-“Nanomaterials, **2021**
The internet NanoGe Conference on Nanocrystals (iNCNC), **2021**
Online NanoGe Spring Meeting, Symposium “Photophysics of nanoscale semiconductors” **2021**
Pacifichem, Honolulu, December **2020** (cancelled for COVID)
NanoGe Online Conference, Fundamental Processes in Semiconductor Nanocrystals, November **2020**
Cell Press Webinar Light/Matter Interactions, June **2020**
NanoGe Online Meetup: Structure-Function Relationships in CO₂ electrocatalysts, June **2020**
NanoGe Online Meetup: Shape-Controlled Nanocrystals: Synthesis, Characterization Methods and Applications, May **2020**
Electrochemistry, German Chemical Society Conference , Berlin **2020** (cancelled for COVID)
EuChemS, European Chemical Society Conference, Lisbon **2020** (cancelled for COVID)
GRC Inorganic Chemistry, Newport, **2020** (cancelled for COVID)

GRC Renewable Energy: Solar Fuels, Tuscany, **2020** (cancelled for COVID)
ACS, Philadelphia, **2020** (cancelled for COVID)
Annic_Applied Nanotechnology and Nanoscience International Conference, Paris, **2019**
NanoGe Conference, Solar Fuels, Berlin, **2019**
Nature Conference Solar Fuels, Wuhan, **2019**
ACS Fall Meeting, San Diego, **2019**
GRC Nanomaterials for Application in Energy technology, Ventura, **2019**
GRC Colloidal Semiconductor Nanocrystals, Smithfield, **2018**
ACS Fall Meeting, Boston, **2018**
E-MRS Spring Meeting, Strasbourg, **2018**
MRS Fall Meeting, Boston, **2017**
EuroMat, Thessaloniki, **2017**
21st Solid State Ionics, Padova, **2017**
RSC ISACS21 Challenges in Nanoscience, Beijing, **2017**

Schools and Workshops:

DFG (German Chemical Society) Colloquium "Catalysts and reactors under dynamic conditions for energy storage and conversion ", February **2021** (online)

Summer School of the European Federation of Catalysis Societies, Slovenia, September **2020** (online)
Online Summer School « Electrocatalysts for Energy Applications", July **2020**
ES3 Symposium_Exciton Engineering in Emerging Semiconductors, Madrid, **2020**
ETH-Japan Catalysis Workshop, ETH Zurich, **2019**
SUNCAT Summer School, Stanford, USA, **2019**
Energy-X Workshop, Brussels, **2019**
FOTOFUEL Workshop, Madrid, Spain, **2019**
SurfCat Summer School, Gilleleje, Denmark, **2018**

Department seminars:

2021 : UW (Seattle), UMass (Boston), NYU (New York)
2020 : Université de Paris, Fritz Haber Institute, ICIQ
2019 : TU Delft, University of Barcellona, LMU Munich, DTU Physics
2018 : University of Oslo, KAUST
2017 : ETH, King's College London, University of Geneva
2016 : University of Bern, Paul Scherrer Institute, Fudan University

4. PRICES and ACADEMIC HONOURS

2024	ACS Inorganic Nanoscience Award
2024	Russel Lecture (Queen's University, Canada)
2023	Eastman Lecture in Catalysis at UC Berkeley (along with Marc Koper, William Mustain, Henry Sheldon White)

At tenure application:

2021	Swiss Chemical Society Werner Price
2019	Thieme Chemistry Journal Award
2019	European Chemical Society Lecture Award
2019	Royal Chemical Society ChemComm Emerging Investigator Lectureship
2018	Endowed Chair from the Sandoz Family Foundation
2017	European Research Council (ERC) Starting Grant
2017	SNSF Assistant Professor Energy Grant

SUMMARY OF TEACHING ACTIVITIES

2022– present	Introduction to chemical engineering Laboratory Works, Bachelor Course (112 hour practice total, 6 experiments, 2 credits)
2017 – present	Nanomaterials for chemical engineering application, Master Course (28 hours lecture, 14 hours practice, 3 credits)
2016 – present	Introduction to Transport Phenomena , Bachelor Course (28 hours lecture, 14 hours exercises, 3 credits)
2016 – present	Project coach in Chemical Engineering Product Design, Master Course (6 hours for meetings, 1 hour for presentations, final report correction)
2017 – 2019	Colloidal synthesis of nanoparticles and their energy applications, PhD Course (24 hours lecture, 4 hours project, 2 credits)

INNOVATION, TECHNOLOGY TRANSFER, PATENTS:

US11884854, 2024: A universal method for producing an oxide shell around nanocrystals – Loiudice, Anna; Buonsanti, Raffaella

US9939662, 2018: Electrochromic Nanocomposites Films- Milliron, Delia J.; Llodes, Anna; Buonsanti, Raffaella; Garcia, Guillermo

US9595363, 2017 : Surface Chemical Modification of Nanocrystals-Brett A.; Milliron, Delia J.; Rosen, Evelyn L.; Buonsanti, Raffaella; Llodes, Anna

US9341913, 2016: Nanostructured Transparent Conducting Oxide Electrochromic Device- Milliron, Delia J.; Tangirala, Ravisubhash; Llodes, Anna; Buonsanti, Raffaella; Garcia, Guillermo

US8961828, 2015: Colloidal Infrared Reflective and Transparent Conductive Aluminum-Doped Zinc Oxide Nanocrystals Milliron, Delia J.; Buonsanti, Raffaella

US9207513, 2015: Nanocrystal-polymer nanocomposite electrochromic device Milliron, Delia J.; Helms, Brett A.; Buonsanti, Raffaella; Garcia, Guillermo; Llodes, Anna; Runnerstrom, Evan L

ADMINISTRATIVE AND OTHER PROFESSIONAL ACTIVITIES

AT EPFL

Institutional Responsibilities :

2024– present Director of the Teaching Section of Chemistry and Chemical Engineering
2023 – present Member of the ISIC Steering Committee

At tenure application:

2019 – present Member of the CIME (EPFL Center of Electron Microscopy) Steering Committee
2020 Member of the Sustainable Travels Working Group
2019 – 2021 Member of the Nanosafe Working Group
2018 – 2022 Member of the Doctoral School Committee of Chemistry and Chemical Engineering
2017 – 2021 Member of the Teaching Committee of Chemistry and Chemical Engineering
2016 - 2018 Chair of the Faculty Meetings, EPFL Valais

Outreach activities :

Interview for Instagram profile of EPFL Chemistry, led by undergraduate students

Participation to the event [Scientastic](#) – Festival des Sciences de l'EPFL to promote EPFL to the general public, 2017, 2019, 2022, 2024

Participation to High-School outreach, 2020, 2023, 2024

Participation to "[ScienceGirls](#)", 2018

Interview for a local magazine [Valais Valeur Ajoutée](#) to reach out to general public, 2016

Membership in Panels, Boards, etc.

2025 ACS National Award Selection Committee (2026-2028 award cycle)
2024 – present Member of the Scientific Advisory Board for the [Advanced Research Center-Chemical Building Blocks Consortium](#), catalysis consortium in the Netherlands
2023 – present Member of the Editorial Advisory Board for ACS Energy Letters
2021 – present Editor in ACS Catalysis, one of the top journals in catalysis science
2021 – present Member of the Award panel of the Swiss Chemical Society
2021 – present Member of the SusChem Subdivision of the Swiss Chemical Society
2021 Chair of the Nanoscience Subdivision of the ACS Division of Inorganic Chemistry

2021 Chair-Elect of the Nanoscience Subdivision of the ACS Division of Inorganic Chemistry
2020 – present Member of the Scientific Advisory Board of Dalton Transactions

2020 – present	Member of the Scientific Advisory Board for Nanoscale
2020 – present	Member of the Scientific Advisory Board for Chemical Communications
2020 – 2021	Member of the Early Career Advisory Board for ACS Materials Letters
2020 – present	Member of the Scientific Advisory Board for Chemistry of Materials
2018 – 2019	Member of the Early Career Advisory Board for ACS Catalysis
2014 – 2015	Lawrence Berkeley National Laboratory Safety Advisory Board Member, Berkeley, US
2013 – 2016	Member of the Molecular Foundry User Executive Committee, Berkeley, USA
2013 – 2021	Member of the User Proposal Review Board of the Molecular Foundry, Berkeley, US
2013 – 2016	Editorial Board Member for Nature Scientific Reports

Individual Scientific Reviewing Activities

Guest Editor ACS Nanoscale Au, Special Issue “Nano energy”, 2024
 Guest Editor for Electrosynthesis Special Issue iScience (Cell Press), 2021
 Guest Editor ACS Inorganic Chemistry Forum titled “The Inorganic Chemistry of Nanoparticles”, 2021

Regular reviewer for Journal of American Chemical Society, Chemistry of Materials, Advanced Materials, Advanced Functional Materials, Chemical Communications, Journal of Materials Chemistry, Physical Chemistry Chemical Physics, Chemical Science, ACS Catalysis, Nature Communications, Nature Catalysis, Nature

Regular reviewer for NWO (Dutch National Science Foundation), European Commission, ACS Petroleum Research Fund, DOE Early Career, DOE BES, NSF Career

Active Membership in Scientific Societies, Fellowships in Renowned Academies

Member of the American Chemical Society (**since 2017**), Swiss Chemical Society (since **2016**), Royal Chemical Society (since **2017**), Materials Research Society (since **2015**)

Conference Organization

2026 Elected co-chair of the Gordon Research Conference “Colloidal Semiconductor Nanocrystals” (US-based conferences, this one finally happening in Switzerland)

2024 General chair of the NanoGe MATSUS24 Fall Meeting <https://www.nanoge.org/MATSUSFall24/home> (top EU conference in chemistry and materials for sustainability, was able to organize it at the SwissTech in Lausanne)

2022 Symposium organizer at NanoGe Fall 2022 Meeting (“#Suschem- Materials and electrochemistry for sustainable fuels and chemicals”)

2022 Symposium organizer at ACS Fall 2022 Meeting (“Inorganic Nanoscience Award”)

2022 Symposium organizer at ACS Spring 2022 Meeting (“Well-Defined Materials for Heterogeneous Catalysis”)

2021 Co-chair with Prof A. Llobet (ICIQ) of the [4th Materials and Molecules for Solar Fuels and Chemicals](#)

2021 Symposium co-organizer at ACS Spring 2021 Meeting (“Inorganic Nanoscience Award”)

2021 Symposium co-organizer at MRS Fall 2021 Meeting ("Women in Materials Science: Pioneers and a Vision for a More Inclusive Future")

2020 Online NanoGe Internet Conference for Quantum Dots iCQD (<https://www.nanoge.org/iCQD/home>)

2018 Chair of the 1st Winter School "Challenges and Opportunities for Energy Research"
(<https://nrg2018.epfl.ch>)