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PROFILE: Early Excellence in *Physical Organic Chemistry*

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# Luis M. Campos

**Date of birth**: 30 July 1978
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**Education**: BS 2001, CSU Dominguez Hills, Carson, CA. PhD 2006, University of California Los Angeles, with Miguel A. Garcia-Garibay and K.N. Houk (Thesis title: Light-induced Processes in Organic Chemistry: Decarbonylations in Crystals, Quantum Tunneling, and Solar Cells).
Postdoc 2006–2011, University of California Santa Barbara, Advisor: Craig J. Hawker
**Awards**: Office of Naval Research Young Investigator (2015), Cottrell Scholar (2015), NSF CAREER Award (2014), 3 M Non-Tenured Faculty Award (2014), ACS PMSE Young Investigator (2014), Paul & Daisy Soros Fellow (2001)
**Current research Interests**: Our group is interested in exploring organic materials for the development of advanced functional systems – from bulk to single-molecule properties. We take advantage of macromolecular structures that can be finely tuned through molecular design and robust synthetic strategies. The interdisciplinary nature of our work allows the group to build strengths in synthesis, device fabrication, and fundamental design and characterization of the materials, from form to function.
**Hobbies**: Outdoorsy stuff: hiking, cycling, kayaking, soccer, dodge ball, people-watching, pigeon aficionado, and so on. Indoorsy stuff: museums, stand-up comedy, plays, and so on.

**Luis M. Campos**

Small molecules, macromolecules, oligomers, and polymers are all fair game in the Campos group, where they are creating fantastic new materials with amazing properties. He is currently an Assistant Professor at Columbia University.

**iOS or Android?** … perpetually connected to iOS.

**If I were not a scientist, I would be** … a chef or a brewer.

**I always wanted to learn how to…** shred guitar like a boss.

**If I could have dinner with any three people, it would be** … my grandmother, Frida Kahlo, and Janis Joplin.

**And I would ask them** … a million things… it would have to be a 14-course meal or a buffet.

**The most influential scientist in my career is** … both Miguel Garcia-Garibay and Craig Hawker.

**The first thing that comes to mind when I think back to my college days is** … having to work three jobs to make ends meet.

**My favorite means of escape is…** The beach (but none of that cold water stuff) and the mountains.

**If I could go back in time, I would** … not.

**The room where I spend most my time at home is** … the kitchen.

**A good day begins with** … with a cortado, reading the news or an email that starts with "I am pleased to inform you…"

**When I retire, the first thing I will do is** … have a cortado and read the news. No email.

**My favorite three films are** … *Y Tu Mama Tambien*, *Amores Perros, National Lampoons Christmas Vacation.*

**My favorite four songs are** … Carousels (Beirut), *Changes* (Tupac), El Son de la Negra

**My favorite food is** … anything Mexican, especially aguachile.

## My 3 top papers:

1. "A Design Strategy for Intramolecular Singlet Fission Mediated by Charge-Transfer States in Donor-Acceptor Organic Materials," Busby, E.; Xia, J.; Wu, Q.; Low, J. Z.; Song, R.; Miller, J. R.; Zhu, X.-Y.; Campos, L. M., Sfeir, M. Y., *Nature Mater.* **2015**, *14*, 426-433. In order to fabricate third-generation solar cells, materials that undergo efficient intramolecular singlet fission must be developed. Here, we provide guidelines to synthesize polymers that yield two triplets per polymer chain (singlet fission), which in turn, can open up new avenues of exploration for the development of singlet fission photovoltaics.
2. "The Evolution of Cyclopropenium Ions into Functional Polyelectrolytes," Jiang, Y.; Freyer, J. L.; Cotanda, P.; Brucks, S. D.; Killops, K. L.; Bandar, J. S.; Torsitano, C.; Balsara, N. P.; Lambert, T. H.; Campos, L. M., *Nat. Commun.* **2015**, *6*, 5950. Here, using the cyclopropenium ion as a monomer, we synthesized materials that exhibit high ionic conductivity and thermal stability, thus rendering this class of new materials as an attractive alternative to develop polyelectrolytes for various applications where delococalized formal charges on carbon can be exploited.

3. "Molecular Length Dictates the Nature of Charge Carriers in Single-Molecule Junctions of Oxidized Oligothiophenes," Dell, E. J.; Capozzi, B.; Xia, J.; Venkataraman, L.; Campos, L. M., *Nature Chem.* **2015**, *7*, 209–214. Using the scanning tunneling microscope–break junction (STM-BJ), it was found that the conducting orbital in oligomers of thiophene-1,1-dioxide changes from the highest occupied molecular orbital (HOMO) to the lowest unoccupied molecular orbital (LUMO), from short to long molecules. This is a significant finding for the design of materials with high electron affinity.