

## **Stephen Barlow**

University of Colorado at Boulder  
Renewable and Sustainable Energy Institute  
027 UCB, Suite N324, SEEC, Boulder, CO 80309-0027, USA  
Email: [stephen.barlow@colorado.edu](mailto:stephen.barlow@colorado.edu)

### **CAREER**

#### **Appointments**

- 2021-present Associate Research Professor  
Renewable and Sustainable Energy Institute (RASEI), University of Colorado Boulder,  
Boulder, CO, USA  
Joint Appointment at the National Renewable Energy Laboratory, Golden, CO, USA
- 2008-2021 Principal Research Scientist  
School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA, USA
- 2003–2008 Senior Research Scientist  
School of Chemistry and Biochemistry, Georgia Institute of Technology, Atlanta, GA, USA
- 2001–2003 Assistant Staff Scientist  
Department of Chemistry, University of Arizona, Tucson, AZ, USA
- 1998–2001 University Lecturer in Inorganic Chemistry / Tutorial Fellow in Inorganic Chemistry  
Department of Chemistry / Lady Margaret Hall, University of Oxford, Oxford, UK
- 1996–1998 Postdoctoral Scholar  
Beckman Institute, California Institute of Technology, Pasadena, CA, USA  
Research Advisor: Seth R. Marder

#### **Education**

- 1992-1996 D. Phil. in Chemistry<sup>†</sup>  
Inorganic Chemistry Laboratory, University of Oxford, Oxford, UK  
Advisor: Dermot O'Hare.  
Thesis: "Studies of Oligomeric Metallocenes"
- 1988-1992 BA (first class honours) in Chemistry<sup>†</sup>  
Inorganic Chemistry Laboratory, University of Oxford, Oxford, UK  
Fourth year research project (part II) advisor: Dermot O'Hare  
Part II thesis: "Structural Studies of Organometallic Intercalation Compounds"

#### **Objectives**

- Participating in high-quality chemistry and/or materials research, through synthesis, spectroscopy, and, where productive, collaborative work with other chemists (organic, inorganic, physical, and/or computational), materials scientists, engineers, and/or physicists.
- Training students and other researchers in how to conduct research in a scientifically sound, safe, and ethical fashion.
- Enthusiating undergraduate and graduate students about the intellectual rewards of chemistry and materials science through effective and engaging teaching.

#### **Research Interests**

In the broadest terms, synthesizing and studying organic and metal-organic compounds with electronic, optical, and/or magnetic properties that have relevance to materials, either directly as compounds that can be used in application-related demonstrations, or indirectly, as model compounds. Specific examples include:

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<sup>†</sup> degrees formally awarded at graduation ceremony in 1999

- Electron delocalization and intramolecular electron-transfer rates in organic and organometallic mixed-valence species;
- Development of redox-active dopants for organic electronics applications, including examples that are strong reductants, yet relatively air stable, and elucidation of the mechanisms by which coupled chemical and electron-transfer reactions can result in doping;
- Applications of electrical doping using redox-active molecular species in a wide range of materials systems and devices;
- Understanding the mechanisms by which different surface-modification approaches can be used to tune the work functions of electrodes and low-dimensional materials;
- For hybrid organic-haloplumbate perovskites and related materials, understanding the relation between the chemical structure of the organic cation and the crystal structures and optical properties of the corresponding 2D or 1D haloplumbates;
- Second- and third-order nonlinear optical properties in organic and organometallic chromophores;
- Control of singlet-triplet excited-state energy separation in small molecules that exhibit thermally activated delayed fluorescence.

## TEACHING EXPERIENCE

### Lectures and Classes

#### *Research Scientist at Georgia Tech:*

"Physical Organic Chemistry" (Chem 6372 or Chem 8833/4803); taught sections (kinetics, mechanism, isotope and substituent effects, and, in some years, catalysis and practical absorption and fluorescence spectroscopy) of this graduate course, 2008-2020.

"Advanced Organic Chemistry" (Chem 4311); taught sections (kinetics, mechanism, isotope and substituent effects) of this undergraduate course, 2013-2020.

"Spectroscopic Identification of Organic Compounds" / "Applied Spectroscopy" (Chem 6371/4341); teaching sections (UV-Vis. spectroscopy, mass spectrometry) of this undergraduate and graduate course, 2019.

"Optical (and Electronic) Properties of (Organic) Materials" (Chem 6484); taught sections (practical absorption and fluorescence spectroscopy; photoelectron spectroscopy) of this graduate course, 2013, 2015, 2016.

"Physical Chemistry of Organic Photovoltaics", guest lectures for a masters course at New Mexico Highlands University, Apr 2010.

"Design of Molecules and Materials for Nonlinear Optics", guest lecture for a masters course taught at Norfolk State University, Apr 2006.

#### *Lecturer and Tutorial Fellow at Oxford:*

"Post-Transition Metal Chemistry", 2<sup>nd</sup> year undergraduate lecture course.

"Inorganic Applications of Spectroscopy and Magnetism", second-year undergraduate lecture course.

Tutorials and small classes for Oxford first- to third-year undergraduates, covering a wide range of inorganic chemistry topics.

Supervision of undergraduate Inorganic Chemistry practical classes, assessing and assisting students' interpretation of their experiments.

Development and presentation of chemistry demonstration lectures on open days for pre-university students.

#### *Graduate Student at Oxford:*

Supervision of synthetic experiments in undergraduate Inorganic Chemistry practical classes, demonstrating the safe use of the reagents and equipment involved.

Teaching chemistry A-level (UK pre-University level exam) revision classes.

## Supervision

### *Current:*

Jointly supervising Ph.D. students and postdocs with Prof. Marder.

### *Research Scientist at Georgia Tech and Arizona:*

Participated in the supervision and mentoring of > 30 Ph.D. students in Prof. Marder's group.

### *Lecturer and Tutorial Fellow at Oxford:*

Supervision and mentoring (as official advisor) of several fourth-year undergraduate (part II, MChem) research students and one graduate (DPhil) student (Christofer Arisandy).

## GRANT WRITING AND REPORTING:

Participated in the writing of > 50 successful grant proposals, and subsequent reporting on these grants, to bodies including: Air Force Office of Scientific Research, Army Research Office, Cambridge Display Technology, Defense Advanced Research Program Agency, Department of Energy, Lintec Corporation, Lumera Corporation, Mitsubishi Chemical, National Science Foundation, Office of Naval Research, Samsung GRO, and Solvay S.A.

### Grants as a Named Investigator

S. R. Marder and S. Barlow, "Dopants, Interface Modifiers, and Film Tethering for Organic Semiconductors", Office of Naval Research, Jan 2024 – Dec 2027, Total: \$660,000.

S. R. Marder, Z. V. Vardeny, and S. Barlow, "Understanding the Relationships Between the Structural, Optical, Electronic, and Spintronic Properties of Chiral Organic Semiconducting and Conducting Materials", Air Force Office of Scientific Research, Sep 2023 – Sep 2026, Total: \$960,000.

W. R. Dichtel, S. R. Marder, and S. Barlow, "Semiconducting Paramagnetic Covalent Organic Frameworks as a New Class of Organic Electronic and Spintronic Materials", Army Research Office, Sep 2023 – Aug 2026, Total: \$ 420,000.

S. Barlow and S. R. Marder, "Chromophores and Solvents for Quasi-Phase Matched Difference Frequency Generation in Liquid Filled Fibers", Air Force Research Laboratory, Jan 2023 – Dec 2024, Total: \$24,987.

S. R. Marder and S. Barlow, "Characterization of Solar-Cell Material Stability – Compact Mass Spectrometer, Thermogravimetric Analysis, and Inert-Atmosphere Glove-Box (DURIP)", Office of Naval Research, Dec 2022 – Nov 2024, Total: \$230,342.

E. L. Ratcliff, E. M. Miller, T. Lian, N. Stingelin, N. R. Armstrong, G. Rumbles, C. Risko, S. R. Marder, J. Mei, S. Barlow, J.-L. Brédas, A. J. Ferguson, A. L. Greenaway, A. D. Printz, O. G. Reid, A. Salleo, M. F. Toney, "EFRC: Center for Soft PhotoElectrochemical Systems (SPECS)", Department of Energy, Aug 2022 – Jul 2026, Total: \$10,950,000.

J.-L. Brédas, S. R. Marder, and S. Barlow, "Novel Electronic, Excitonic, and Optical Features in 2D Lead-Halide Hybrid Perovskites via Tuning of the Electronic Couplings Between Organic Spacers and Inorganic Layers", Office of Naval Research, May 2023 – May 2024, Total: \$100,000. Grant No. N00014-22-1-2379.

S. R. Marder, G. Rumbles, D. S. Ginley, S. Barlow, O. R. Luca, " Kinetically Stable Redox-Based Approaches to Energy Storage for Selective Electron-to-Molecule Chemistry in the Context of a Circular Economy", National Renewable Energy Laboratory, Oct 2021 – Sep 2024, Total: \$550,000.

S.R. Marder and S. Barlow, "Solution-Processed Bulk Heterojunctions Based on Conjugated Polymers and Small Molecules for Near-Infrared Detectors", Cambridge Display Technology. Nov 2018 – March 2019. Total: £50,000.

S.R. Marder and S. Barlow, Work function Tuning of Conducting Oxides Using Molecular n-Dopants. Samsung GRO. November 15, 2013 – November 14, 2014. Total award: \$99,999. Contract No. AGMT DTD 1/7/2014

S.R. Marder and S. Barlow, Synthetic and Mechanistic Studies of Air-Stable Organometallic Dimers as n-Dopants for Organic Electronics, NSF. August 15, 2013 – July 31, 2017. Total award: \$358,497. DMR-1305247

S.R. Marder and S. Barlow, "New Chromophores and Polymers for Electrooptic Applications", Lumera Corporation, 2005. Resulted in Gift.

S.R. Marder, B. Kippelen, and S. Barlow, Studies of Metal-Organic and Organic Charge-Transport for Plastic Opto-electronics. National Science Foundation. September 1, 2003 - August 31, 2007. Total award: \$486,000 Award No. ECCS-0309131

S. Barlow, "New Cationic Organometallic Conducting Polymers", Royal Society (UK), 1999.

## SERVICE:

### Reviewing

Submissions to journals including: *Accounts of Chemical Research*, *ACS Applied Materials and Interfaces*, *ACS Macro Lett.*, *ACS Mater. Lett.*, *Advanced Functional Materials*, *Advanced Materials*, *Advanced Science*, *Angewandte Chemie*, *Chemical Physics Letters*, *Chemical Communications*, *Chemical Reviews*, *Chemical Science*, *Chemistry – A European Journal*, *Chemistry of Materials* (2017 Reviewer Excellence Award), *Crystal Engineering Communications*, *Crystal Growth and Design*, *Dalton Transactions*, *Energy and Environmental Science*, *European Journal of Inorganic Chemistry*, *Industrial and Engineering Chemistry Research*, *Inorganic Chemistry*, *Journal of Materials Chemistry A and C*, *Journal of Organic Chemistry*, *Journal of Organometallic Chemistry*, *Journal of Physical Chemistry*, *Journal of Physical Chemistry Letters*, *Journal of the American Chemical Society*, *Journal of the Optical Society of America B*, *Nanoscale*, *Nature Communications*, *New Journal of Chemistry*, *Optical Materials Express*, *Organic and Biological Chemistry*, *Organic Electronics*, *Organic Letters*, *Organometallics*, *Phys. Chem. Chem. Phys.*, *RSC Advances*, *Science*, and *Synthetic Metals*.

Proposals for American University of Beirut Research Grants, Austrian Science Fund, Engineering and Physical Sciences Research Council (UK), National Science Foundation, Petroleum Research Fund

### Lecturing at Minority-Serving Institutions

Norfolk State University, New Mexico Highlands University

### Other

Georgia Tech Institutional Research Faculty Promotions Committee, 2012-2018, other Research Faculty Promotion activities at College of Science level

## PUBLICATIONS, PATENTS, AND PRESENTATIONS

Over 340 peer-reviewed publications with an h-index = 74 (Web of Science, Jan 2023).

### Book Chapters

1. S. Barlow, S. R. Marder, X. Lin, F. Zhang, and A. Kahn, "Electrical Doping of Organic Semiconductors with Molecular Oxidants and Reductants", in *Handbook of Conducting Polymers, Fourth Edition, Vol. 2, Conjugated Polymers: Properties, Processing, and Applications*, ed. J. R. Reynolds, B. C. Thompson, and T. A. Skotheim, CRC Press, 2019.
2. M. Rumi, S. Barlow, J. Wang, J.W. Perry, and S.R. Marder, "Two-Photon Absorbers and Two-Photon-Induced Chemistry", in *Photoresponsive Polymers I (Advances in Polymer Science, Vol. 213)*, ed. S. R. Marder and K.-S. Lee, Springer, 2008 (doi: 10.1007/12\_2008\_133).
3. S. Barlow and S. R. Marder, "Nonlinear Optical Properties of Organic Materials", in  *$\pi$ -Conjugated Organic Materials*, ed. T. J. J. Müller and U. H. F. Bunz, Wiley-VCH, 2007 (doi: 10.1002/9783527610266.ch11).

4. M. E. Thompson, P. E. Djurovich, S. Barlow, and S. R. Marder, "Organometallic Complexes for Optoelectronic Applications", in *Comprehensive Organometallic Chemistry III*, Vol. 12, ed. D. O'Hare (Series editors R. Crabtree and M. Mingos), Elsevier, 2006.
5. B. Kippelen, S. Yoo, J. A. Haddock, B. Domercq, S. Barlow, B. Minch, W. Xei, S. R. Marder, and N. R. Armstrong, "Liquid-Crystal Approaches to Organic Photovoltaics", in *Organic Photovoltaics: Mechanisms, Materials, and Devices*, ed. S.-S. Jun and N. S. Sariciftci, CRC Press, 2005 (doi: 10.1201/9781420026351.ch11).

#### Peer-Reviewed Journal Articles

1. A. A. Mohapatra, W. K. Yual, Y. Zhang, A. A. Samoylov, J. Thurston, C. M. Davis, D. P. McCarthy, A. D. Printz, M. F. Toney, E. L. Ratcliff, N. R. Armstrong, A. L. Greenaway, S. Barlow\*, and Seth R. Marder\*, "Reducing Delamination of an Electron-Transporting Polymer from a Metal Oxide for Electrochemical Applications", *Chem. Commun.*, 2024, **60**, 988-991 (doi: 10.1039/D3CC05391A).
2. Y. Shi, D. P. McCarthy, D. Lungwitz, F. Jiang, M. Taddei, H. Contreras, Y. Lin, A. A. Mohapatra, K. Tang, Y. Zhang, S. Barlow, A. Kahn, S. R. Marder\*, and D. S. Ginger\*, "Photo-Crosslinkable Naphthalene Diimide Polymer for Solution-Processed *n-i-p* Perovskite Solar Cells", *Chem. Mater.* 2024, **36**, 795-802 (doi: 10.1021/acs.chemmater.3c02295).
3. K. Singh, A. A. Mohapatra, D. Giri, C. Gangadharappa, S. Jhulki, S. Barlow, S. R. Marder, A. Ghosh, S. Patil, and N. Chauhan\*, "Ambipolar Doping in  $\pi$ -Conjugated Polymers", *ACS Appl. Electron. Mater.*, 2023, **5**, 6765-6777 (doi: 10.1021/acsaelm.3c01241).
4. K. Tang, M. R. Brown, C. Risko, M. K. Gish, G. Rumbles, P. H. Pham, O. R. Luca, S. Barlow\*, and S. R. Marder, "Beyond n-Dopants for Organic Semiconductors: Use of Bibenzo[*d*]imidazoles in UV-Promoted Dehalogenation Reactions of Organic Halides", *Beilstein J. Org. Chem.*, **2023**, *19*, 1912-1922 (doi: 10.3762/bjoc.19.142).
5. S. K. Mohapatra\*, K. Al Kurdi, S. Jhulki, G. Bogdanov, J. Bacsa, M. Conte, T. V. Timofeeva, S. R. Marder\*, and S. Barlow\*, "Benzoimidazolium-Derived Dimeric and Hydride n-Dopants for Organic Electron-Transport Materials: Impact of Substitution on Structures, Electrochemistry, and Reactivity", *Beilstein J. Org. Chem.*, **2023**, *19*, 1651-1663 (doi: 10.3762/bjoc.19.121).
6. C. Gatsios, A. Opitz, D. Lungwitz, A. E. Mansour, T. Schultz, D. Shin, S. Hammer, J. Pflaum, Y. Zhang, S. Barlow, S. R. Marder, and N. Koch\*, "Surface Doping of Rubrene Single Crystals by Molecular Electron Donors and Acceptors", *Phys. Chem. Chem. Phys.*, 2023, **25**, 29718-29726 (doi: 10.1039/D3CP03640E).
7. P. H. Pham, S. Barlow, S. R. Marder, and O. R. Luca\*, "Electricity-Driven Recycling of Ester Plastics Using One-Electron Electro-Organocatalysis", *Chem Catalysis*, 2023, **3**, 100677/1-10 (doi: 10.1016/j.cheecat.2023.100675).
8. H. A. Nguyen, G. Dixon, F. Y. Dou, S. Gallagher, S. Gibbs, D. M. Ladd, E. Marino, J. C. Ondry, J. P. Shanahan, E. S. Vasileiadou, S. Barlow, D. R. Gamelin, D. S. Ginger, D. M. Jonas, M. G. Kanatzidis, S. R. Marder, D. Morton, C. B. Murray, J. S. Owen, D. V. Talapin, M. F. Tony, and B. M. Cossairt\*, "Design Rules for Obtaining Narrow Luminescence from Semiconductors Made in Solution", *Chem. Rev.*, 2023, **123**, 7890-7952 (doi: 10.1021/acs.chemrev.3c00097).
9. R. Wang, T. Schultz, A. Papadogianni, E. Longhi, C. Gatsios, F. Zu, T. Zhai, S. Barlow, S. R. Marder, O. Bierwagen, P. Amsalem, and N. Koch\*, "Tuning the Surface Electron Accumulation Layer of In<sub>2</sub>O<sub>3</sub> by Adsorption of Molecular Electron Donors and Acceptors", *Small*, 2023, **19**, 2300730/1-9 (doi: 10.1002/sml.202300730)
10. D. Lungwitz, S. Joy, A. E. Mansour, A. Opitz, C. Karunasena, H. Li, N. A. Panjwani, K. Moudgil, J. Behrends, S. Barlow, S. R. Marder, J.-L. Brédas, K. Graham\*, N. Koch\*, and A. Kahn\*, "Spectral Signatures of a Negative Polaron in a Doped Polymer Semiconductor: Energy Levels and Hubbard *U* Interactions", *J. Phys. Chem. Lett.*, 2023, **14**, 5633-5640 (doi: 10.1021/acs.jpcclett.3c01022)

11. L. Zhao, D. D. Astridge, W. B. Gunnarson, Z. Xu, J. Hong, J. Scott, S. Kacmoli, K. Al Kurdi, S. Barlow, S. R. Marder, C. F. Gmachl, A. Sellinger, and B. Rand\*, "Thermal Properties of Polymer Hole-Transport Layers Influence the Efficiency Roll-off and Stability of Perovskite Light-Emitting Diodes", *Nano Lett.*, 2023, **23**, 4785-4792 (doi: 10.1021/acs.nanolett.3c00148).
12. T. Schultz, P. Bärmann, E. Longhi, R. Meena, Y. Geerts, Y. Gogotsi, S. Barlow, S. R. Marder, T. Petit, and N. Koch\*, "Work Function and Energy Level Alignment Tuning at  $Ti_3C_2T_x$  MXene Surfaces and Interfaces Using (Metal-)Organic Donor/Acceptor Molecules", *Phys. Rev. Mater.*, 2023, **7**, 045002/1-9 (doi: 10.1103/PhysRevMaterials.7.045002).
13. D. W. Burke, R. R. Dasari, V. K. Sangwan, A. K. Oanta, Z. Hirani, C. E. Pelkowski, Y. Tang, R. Li, D. C. Ralph, M. C. Hersam, S. Barlow, S. R. Marder\*, and W. R. Dichtel\*, "Synthesis, Hole Doping, and Electrical Properties of a Semiconducting Azatriangulene-Based Covalent Organic Framework", *J. Am. Chem. Soc.*, 2023, **145**, 11969-11977 (doi: 10.1021/jacs.2c12371).
14. F. Pallini, S. Mattiello, N. Manfredi, S. Mecca, A. Federov, M. Sassi, K. Al Kurdi, Y.-F. Ding, C.-K. Pan, J. Pei, S. Barlow, S. R. Marder, T.-Q. Nguyen, and L. Beverina\*, "Direct Detection of Molecular Hydrogen Upon p- and n-Doping of Organic Semiconductors with Complex Oxidants or Reductants", *J. Mater. Chem. A*, 2023, **11**, 8192-8201 (doi: 10.1039/D3TA00231D).
15. F. Saedifard, Y. Naeem, Y. T. Boni, Y.-C. Chang, J. Zhang, Y. Zhang, B. Kippelen, S. Barlow, H. M. L. Davies\*, and S. R. Marder\*, "Dirhodium C-H Functionalization of Hole-Transport Materials", *J. Org. Chem.*, 2023, **88**, 4309-4316 (doi: 10.1021/acs.joc.2c02888).
16. Y. Lin\*, Y. Zhang, A. Magomedov, E. Gkogkosi, J. Zhang, X. Zheng, A. El-Labban, H. Chen, S. Barlow, V. Getautis, E. Wang, L. Tsetseris, S. R. Marder, I. McCulloch, and T. D. Anthopoulos\*, "18.73% Efficient and Stable Inverted Organic Photovoltaics Featuring a Hybrid Hole-Extraction Layer", *Mater. Horiz.*, 2023, **10**, 1292-1300 (doi: 10.1039/D2MH01575G).
17. H. Chen, S. Y. Jeong, J. Tian, Y. Zhang, D. R. Naphade, M. Alsufyani, W. Zhang, S. Griggs, H. Hu, S. Barlow, H. Y. Woo, S. R. Marder, T. D. Anthopoulos, I. McCulloch, and Y. Lin\*, "A 19% Efficient and Stable Organic Photovoltaic Device Enabled by a Guest Nonfullerene Acceptor with Fibril-Like Morphology", *Energy Environ. Sci.*, 2023, **16**, 1062-1070 (doi: 10.1039/d2ee03483b).
18. S. O. Furer, K. J. Rietwyk, F. Pulvirenti, D. P. McMeekin, M. A. Surmiak, S. R. Raga, W. Mao, X. Lin, Y. Hora, J. Wang, Y. Shi, S. Barlow, D. S. Ginger, S. R. Marder\*, and U. Bach\*, "Naphthalene-imide Self-assembled Monolayers as a Surface Modification of ITO for Improved Thermal Stability of Perovskite Solar Cells", *ACS Appl. Energy Mater.*, 2023, **6**, 667-677 (doi: 10.1021/acs.aem.2c02735).
19. D. Lungwitz, A. E. Mansour, Y. Zhang, A. Opitz, S. Barlow, S. R. Marder, and N. Koch\*, "Improving the Resistance of Molecularly Doped Polymer Semiconductor Layers to Solvent", *Chem. Mater.*, 2023, **35**, 672-681 (doi: 10.1021/acs.chemmater.2c03262).
20. M. Taddei, J. A. Smith, B. M. Gallant, S. Zhou, R. J. E. Westbrook, Y. Shi, J. Wang, J. N. Drysdale, D. P. McCarthy, S. Barlow, S. R. Marder, H. J. Snaith, and D. S. Ginger\*, "Ethylenediamine Addition Improves Performance and Suppresses Phase Instabilities in Mixed-Halide Perovskites", *ACS Energy Lett.*, 2022, **7**, 4265-4273 (doi: 10.1021/acsenergylett.2c01998).
21. G. Persson, E. Järsvall, M. Röding, R. Kroon, Y. Zhang, S. Barlow, S. R. Marder, C. Müller, and E. Olsson\*, "Visualisation of Individual Dopants in a Conjugated Polymer: Sub-nanometre 3D Spatial Distribution and Correlation with Electrical Properties", *Nanoscale*, 2022, **14**, 15404-15413 (doi: 10.1039/d2nr03554e).
22. M. Cooper, X. Zhang, Y. Zhang, A. Ashokan, C. Fuentes-Hernandez, S. Salman, B. Kippelen\*, S. Barlow\*, and S. R. Marder\*, "Delayed Luminescence in 2-Methyl-5-(penta(9-carbazolyl)phenyl)-1,3,4-oxadiazole Derivatives", *J. Phys. Chem. A*, 2022, **126**, 7480-7490 (doi: 10.1021/acs.jpca.2c05392).
23. Y. Lin, Y. Zhang, J. Zhang, M. Marcinkas, T. Malinauskas, A. Magomedov, M. I. Nugraha, D. Kaltsas, D. R. Naphade, G. T. Harrison, A. El-Labban, Abdulrahman, S. Barlow, S. De Wolf, E. Wang, I. McCulloch, L. Tsetseris, V. Getautis, S. R. Marder, and T. D. Anthopoulos, "18.9% Efficient Organic

- Solar Cells Based on n-Doped Bulk-Heterojunction and Halogen-Substituted Self-Assembled Monolayers as Hole Extracting Interlayers", *Adv. Energy Mater.*, 2022, 12, 2202503/1-9 (doi: 10.1002/aenm.202202503).
24. F. Saeedifard, Y-C. Chang, B. Kippelen, S. R. Marder\*, and S. Barlow\*, "Thermal Insolubilization of Electrically n-Doped Films Achieved Using 7-Alkoxy-Benzocyclobutene-Substituted Fullerene and Dopant Molecules", *J. Phys. Chem. B*, 2022, **126**, 8094-8101 (doi: 10.1021/acs.jpcc.2c05286).
  25. F. Saeedifard, D. Lungwitz, Z.-D. Yu, S. Schneider, A. E. Mansour, A. Opitz, S. Barlow, M. F. Toney, J. Pei\*, N. Koch\*, and S. R. Marder\*, "Use of Multiple Hydride Donor to Achieve an n-Doped Polymer with High Solvent Resistance", *ACS Appl. Mater. Interfaces*, 2022, **14**, 33598-33605 (doi: 10.1021/acsmi.2c05724).
  26. E. Järsvall, T. Biksup, Y. Zhang, R. Kroon, S. Barlow, S. R. Marder, and C. Müller\*, "Double Doping of a Low-Ionization-Energy Polythiophene with a Molybdenum Dithiolene Complex", *Chem. Mater.*, 2022, **34**, 5673-5679 (doi: 10.1021/acs.chemmater.2c01040).
  27. K. Al Kurdi, S. A. Gregory, M. P. Gordon, J. F. Ponder, A. Atassi, J. M. Rinehart, A. L. Jones, J. J. Urban, J. R. Reynolds, S. Barlow, S. R. Marder\*, and S. K. Yee\*, "Iron(III) Dopant Counterions Affect the Charge Transport Properties of Poly(Thiophene) and Poly(Dialkoxythiophene) Derivatives", *ACS Appl. Mater. Interfaces*, 2022, **14**, 29039-29015 (doi: 10.1021/acsmi.2c03414).
  28. S. K. Mohapatra, S. R. Marder\*, and S. Barlow\*, "Organometallic and Organic Dimers: Moderately Air-Stable Yet Highly Reducing n-Dopants". *Acc. Chem. Res.*, 2022, **55**, 319-332 (doi: 10.1021/acs.accounts.1c00612).
  29. M.-H. Tremblay, A. Boyington, S. Rigin, J. Jiang, J. Bacsá, K. Al Kurdi, V. N. Khurstalev, R. Pachter, T. V. Timofeeva, N. Jui, S. Barlow\*, and S. R. Marder\*, "Hybrid Organic Lead Iodides: Role of Organic Cation Structure in Obtaining 1D Chains of Face-Sharing Octahedra vs 2D Perovskites", *Chem. Mater.*, 2022, **34**, 935-946 (doi: 10.1021/acs.chemmater.1c01642).
  30. H. L. Smith, J. T. Dull, S. K. Mohapatra, K. Al Kurdi, S. Barlow, S. R. Marder, B. P. Rand, and A. Kahn\*, "Powerful Organic Molecular Oxidants and Reductants Enable Ambipolar Injection in a Large-Gap Organic Homojunction Diode", *ACS Appl. Mater. Interfaces*, 2022, **14**, 2381-2389 (doi: 10.1021/acsmi.1c21302).
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## Presentations

1. "Chemistry of DMBI-H n-Dopants: Reaction Mechanisms and Incorporation into Multifunctional Dopants", invited talk, *The International Chemical Congress of Pacific Basin Societies 2021 (Pacifichem 2021, virtual)*, Dec 16-21, 2021
2. "Chemistry of Dimeric and Hydride-Donor n-Dopants for Organic Electronics", invited talk, *2020 Virtual MRS Spring/Fall Meeting*, Nov 28 - Dec 4, 2020.
3. "Dimers of Highly Reducing Odd-Electron Species – An Approach to Relatively Stable Powerful n-Dopants", seminar, Air Force Research Laboratory, Dayton, OH, Jun 7, 2019.
4. "Redox-Active Molecules as Electrical Dopants for OLED Transport Materials", invited talk, *S. P. I. E. Optics and Photonics*, San Diego, CA, Aug 19-23, 2018.
5. "Dimers of Highly Reducing Odd-Electron Species – An Approach to Relatively Stable Powerful n-Dopants", invited talk, *2017 MRS Fall Meeting*, Boston, MA, Nov 26 - Dec 1, 2017.
6. "Coupling Electron Transfer and Bond Cleavage to Moderate the Reactivity of Strong Reductants", invited talk, *2016 MRS Fall Meeting*, Boston, MA, Nov 27 - Dec 2, 2016.
7. "Taming the Reactivity of Powerful n-Dopants", contributed talk, *2015 MRS Fall Meeting*, Boston, MA, Nov 29 - Dec 4, 2015.
8. "Dimeric n-Dopants for Organic Electronics: Controlling the Thermodynamics and Kinetics of Strong Reducing Agents", seminar, New Mexico Highlands University, Las Vegas, NM, Sep 30 2015.
9. "Dimers of Organometallic Sandwich Compounds: Air-Stable Highly Reducing n-Dopants for Organic Electronics", poster, *12<sup>th</sup> European Conference on Molecular Electronics (ECME 2013)*, London, UK, Sep 3-7, 2013.
10. "Dithienopyrrole as a Building Block for Small Molecules and Conjugated Polymers: Comparison of Electronic and Optical Properties to Those of Analogs Based on Bithiophene and Other Bridged Bithiophenes", contributed talk, *242<sup>nd</sup> American Chemical Society National Meeting*, Denver, CO, Aug 28 – Sep 1, 2011.
11. "Organometallic and Coordination Compounds as n- and p-Dopants in Organic Electronics", contributed talk, *242<sup>nd</sup> American Chemical Society National Meeting*, Denver, CO, Aug 28 – Sep 1, 2011.

12. "Delocalization and Electron Transfer in Bis(Triarylamine) Radical Cations", seminar, Chemistry Department, Northern Arizona University, Flagstaff, AZ, Nov 6 2009.
13. "Organic Materials with Large Two-Photon Cross-Sections and Third-Order Polarizabilities", invited talk, *Macromex 2008, 1<sup>st</sup> US-Mexico Symposium on Advances in Polymer Science*, Los Cabos, Baja California Sur, Mexico, Nov 7-10, 2008.
14. "Bis(Triarylamine) Radical Cations and Dications", talk at symposium celebrating NMHU X-ray facilities, New Mexico Highlands University, Las Vegas, NM, Mar 20 2008.
15. "Norborene-Based Copolymers with Pendant Heavy-Metal Phosphors and Bis(Carbazole) Groups and Their Use in Light-Emitting Diodes", contributed talk, *235<sup>th</sup> American Chemical Society National Meeting*, New Orleans, LA, Apr 6-10, 2008."
16. "Radical Cations and Dications of Bis(Diarylamine) Compounds", poster, *9<sup>th</sup> European Conference on Molecular Electronics (ECME 2007)*, Metz, France, Sep 5-8, 2007.
17. "Organic Materials with Very Large Two-Photon Cross-Sections", invited talk, *Ninth International Conference on Frontiers of Polymers and Advanced Materials*, Cracow, Poland, Jul 8-12, 2007.
18. "Conjugated Molecules: Electron Delocalization, Charge Transport, Nonlinear Optics", seminar, Institute for Solid-State Physics, Graz University of Technology, Graz, Austria, Oct 13, 2006.
19. "Third-order Nonlinear Optical Properties of Extended Squaraine Chromophores", contributed talk, *9<sup>th</sup> International Conference on Organic Nonlinear Optics / International Conference on Organic Photonics and Electronics 2006 (ICONO'9 / ICOPE 2006)*, Bruges, Belgium, Sep 24-26, 2006.
20. "Probing Delocalization in Conjugated Molecules: Diamine Radical Cations and Organometallic Polymethines", seminar, Center for Materials Research, Norfolk State University, Norfolk, VA, April 17, 2006.
21. "Bis(Triarylamine) Mono- and Dications with Arylene-Vinylene Bridges: Structures, Electron Transfer, and Nonlinear Optical Properties", poster, *225<sup>th</sup> American Chemical Society National Meeting*, Atlanta, GA, March 26-30, 2006.
22. "Structures and Optical Properties of Bis(Triarylamine)s with Arylene-Vinylene Bridges in Neutral, Monocationic and Dicationic Oxidation States", poster, *International Conference on Organic Photonics and Electronics 2005 / 8<sup>th</sup> International Conference on Organic Nonlinear Optics (ICOPE 2005 / ICONO'8)*, Matsushima, Japan, Mar 7-11, 2005.
23. "Development of Charge-Transport Materials for Organic Electronics", seminar, Institute of Chemistry, Chinese Academy of Sciences, Beijing, China, Mar 5, 2005.
24. "Advances in Two-Photon Materials and Applications", invited talk, *Seventh International Conference on Frontiers of Polymers and Advanced Materials*, Bucharest, Romania, Jun 10-15, 2003.
25. "Advances in Organic Semiconductors for Imaging", talk (given on behalf of B. Kippelen), *Seventh International Conference on Frontiers of Polymers and Advanced Materials*, Bucharest, Romania, Jun 10-15, 2003.
26. "Intervalence Charge Transfer in Mixed-Valence Ferrocene and Cobaltocene Systems with Group 4 Element Bridging Groups", contributed talk, *225<sup>th</sup> American Chemical Society National Meeting*, New Orleans, LA, Mar 2-27, 2003.
27. "Two-Photon Absorption and Mixed-Valence Properties of Dioxaborine Derivatives", contributed talk, *225<sup>th</sup> American Chemical Society National Meeting*, New Orleans, LA, USA, Mar 2-27, 2003.
28. "Advances in Structure-Property Relationships for Multiphoton-Absorbing Materials", invited talk, *International Symposium on Optical Science and Technology, S. P. I. E. 47<sup>th</sup> Annual Meeting*, Seattle, WA, Jul 7-11 2002.
29. "Spectroscopic Studies of Metallocene-Based Chromophores", poster, *214<sup>th</sup> American Chemical Society National Meeting*, Las Vegas, NV, Sep 7-11, 1997.