

# Cheng Zhang, Ph.D.

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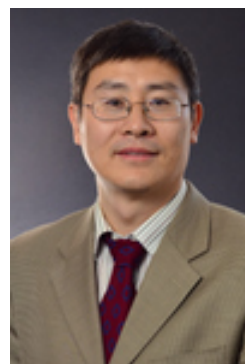
## Work Address:

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## Education

**Ph. D.** Organic/Polymer/Materials Chemistry, Department of Chemistry, University of Southern California. **1999.** Advisor: **Larry R. Dalton.**

**With a milestone achievement in electro-optic material research,** *Science News*, Vol 157, No. 15, p231, April 8, 2000. *C&EN News*, vol. 78, pp.12-3, 2000. *LA Times*, April 7, 2000. *US News – Business and Technology*, April 17, 2000.

**Ph. D. Candidate,** Laser Spectroscopy and Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. **1991-1993.** Among 4 out of 30 graduate students selected for direct enrollment in the Ph.D. program.

**B. S. (with Honors),** Physical Chemistry, Department of Chemistry, Wu Han Univ., China. **1987.**

## Professional Experience

2011.8 – **Assistant Professor,** D. of Chemistry and Biochemistry, South Dakota State University  
2009.1 – 2011.8 **Associate Professor,** Department of Chemistry, Norfolk State University  
2007 – 2011.6 **Common NMR Facility Manager,** Center for Materials Research, NSU.  
2004.6–2008.12 **Research Associate Professor,** Norfolk State University, Norfolk, Virginia.  
2001 – 2004.5 **Director,** Material R&D, Pacific Wave Industries, El Segundo, CA 90245.  
2000 – 2004.5 **Chief Chemist,** Pacific Wave Industries, El Segundo, CA 90245.  
1999 – 2000 **Postdoctoral Fellow,** Loker Hydrocarbon Institute, University of Southern California.

## Honors and Awards

2010.5 The Researcher of the Year, Department of Chemistry, Norfolk State University.  
2001 “Major breakthrough in high speed 10 Gbps and 40 Gbps optical modulator technology.”  
Business Wire, Los Angeles, June 18, 2001. News release of Pacific Wave Communications, Ltd. Los Angeles, California.  
1991 Excellent Graduate Student Leadership Award, Dalian Institute of Chemical Physics.  
1986 – 1987 Excellent Student Award, Wuhan University.  
1983 – 1984 Excellent Student Award (so called Three-Merit Student Award), Wuhan University.

## Current Research:

- Solution processable amorphous organic semiconducting materials (polymers and chromophores) with good carrier mobility for OPV and OFET applications.
- Low band gap semiconducting small molecules and polymers for photovoltaics.
- Air- and sun light-stable luminescent chromophores for remote optical sensing. A project in Air Force BioPaints MURI program.

- Molecular engineering of second-order NLO chromophores for organic electro-optic (OEO) devices.
- Conversion of Lignin into chemicals via hydrothermal treatment.

## Research Funding:

2014.9.1 – 2017.8.31 MRI: Acquisition of an Analytical Transmission Electron Microscope (TEM) with High Resolution for Multi-disciplinary Research and Training," is under the direction of Zhengrong Gu, Qi H. Fan, Cheng Zhang, Ruanbao Zhou, Heike Bucking. Award 1427888: \$775,155.00

2014.9.1 – 2016.8.31 MRI: Development of Novel Instrumentation to Probe Nanoscale Charge Carrier Dynamics with high Temporal and Spatial Resolution," Qiquan Qiao (PI), Cheng Zhang, Zhengtao Zhu, David W. Galipeau. Grant #: 1428992, \$ 450,065.00.

2013.8.1 – 2016.7.31 **Participant**, NSF EPSCoR Track II. Collaborative Research: Dakota Bioprocessing Consortium (DakotaBioCon) \$3M. ~\$260K for Zhang. Award #: IIA-1330842

2013.8.22 – 2014.8.21 **PI**, South Dakota Board of Regents (SDBOR) Competitive Research Grant Award (Continuation). SDBOR/SDSU 2013-10-06, \$99,569. Project title: Development of A Common Strategy to Address Fundamental Problems in Organic Electro-Optic, Photovoltaic and Electronic Thin Film Devices.

2013.1 – 2016.1 **Co-PI**, NASA EPSCoR NNX13AD31A, \$750K (\$107,253 for Zhang). Project title: Flexible Electronics for Space Applications: Development of New Materials and Device Processing Technologies.

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 2012.9.1 – 2014.8.31 "MRI: Acquisition of a Powder/Thin Film X-ray Diffractometer for Alternative Energy Research and Education," Hongshan He (PI), Lin Wei, Cheng Zhang, David W. Galipeau. NSF MRI grant (grant no. 1229577) \$271,189.00

2011.8.1 – 2014.7.31 D. of Chemistry and Biochemistry Start-up funds (\$225,000) from NSF EPSCoR Program (Grant No. 0903804).

2010.9.29– 2014.4.30 **Co-PI**, Air Force MURI: BioPaints, led by Carson Meredith at GeorgeTech. Award #: FA9550-10-1-0555. \$6M/5 yr. (\$485,000-141,666/5yr). Project title: Bio-enabled Particle Adherents for Interrogative Spectroscopy (BioPaints)

2012.8.22 – 2013.8.21 **PI**, South Dakota Board of Regents (SDBOR) Competitive Research Grant Award. SDBOR/SDSU 2012-10-06, \$99,425. Project title: Design and Synthesis of Electro-Optic Chromophores for Spatial Light Modulation.

2012 **PI**, US AFRL/UES Project No. P875-70 under Service P.O. No. S-875-070-004. \$40,000

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 2010 – 2011 **Co-PI and Thrust II Leader**, NSF CREST Center for Nano-, Bio-Inspired Materials and Devices (CNBMD). HRD Award #: 1036494, \$5M.

2010-2011 **PI**, "Biochemical Research and Development for Enhanced Electro-Optic Biopolymer Properties" Sponsor: Air Force Research Lab. Subcontract from Universal Technology Corporation: Primary contract No. FA8650-090-D-5037. Subcontract (Service PO) No. S-875-070-004 (project No. P875-70). \$118K

- 2010 NNIN Laboratory Experience for Faculty. \$12,000 support for one-month work at the NanoTech User Facility (NTUF) and at the Department of Chemistry, University of Washington.
- 2009 – 2011 **Participant**, NSF ERC- Center for Integrated Access Network (U. Arizona). Award #: EEC 0812072, \$20M/5yrs. Subcontract: \$90k.
- 2009 – 2011 **Co-PI**, Research and Infrastructure Support for Renewable Energy in Materials Science and Engineering at Norfolk State University. NSF award #: 0931373, 9/1/09 – 8/31/2012. \$1M.
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- 2007 **Senior participant**. Enhancement of Research and Infrastructure in Support of the New Ph.D. Program in Materials Science and Engineering at Norfolk State University. NSF-RISE- HRD-0734846 (Award ID), \$999,950.00
- 2003.6 – 2005 **Chief Chemist**, Air Force SBIR AF02-132, Phase II. Contract #: F33615-03-C-5412. \$750,000. Title: *Conductive Polymers for Electro-Optic Applications*.
- 2003.3 – 2005 **PI**, BMDO SBIR project 01-014, Phase II, Contract #: F33615-03-C-5407, \$750,000. Title: *Optimization of Electro-Optic Polymers for Efficient Poling at High Temperatures*
- 2002 **PI**, Air force SBIR project AF02-132, Phase I, Contract #: F33615-02-M-5412, \$99,592. Title: *Optimization of Polymer Claddings for Polymer-Based Electro-Optic Devices*.
- 2002 **PI**, Material development for Fiber Optic Gyro project, Navy Air Warfare Center, Weapons Division (China Lake, CA). \$350,000. Title: *Low Birefringence, High Resistivity, Thermally Stable, Low-Loss Electro-Optic Polymers*
- 2001 – 2002 **PI**, Material synthesis contracts from DOD Labs (Air Force Rome lab, Navy Air Warfare Center, Weapons Division, et al), \$320,000.
- 2001 **PI**, BMDO SBIR project 01-014, Phase I, Contract #: F33615-01-M-5424, \$64,604. Title: *Thermally Stable and Highly Active Polymer Electro-Optic Materials*.

#### Research Collaborators:

Qiquan Qiao (EE, SDSU), Jimmy Gu (Ag Engineering, SDSU), Douglas Raynie (Chem, SDSU), Bruce Robinson (Chemistry, UW at Seattle), Larry Dalton (Chemistry, UW at Seattle), Bob Norwood (Optical Science, UAz, Tucson), Jiang, Xiaomei (Physics, U. South Florida. [xjiang@cas.usf.edu](mailto:xjiang@cas.usf.edu)).

#### In the past :

Prof. William H. Steier (EE, U. Southern California), Prof. William Weber (Chemistry, USC), Prof. Harold R. Fetterman (EE, UCLA), Prof. Ray Chen (EE, UT Austin), Prof. Ammon Yariv (Nobel Laureate, EE, CalTech), Prof. Peter Günter (ETHZ, Switzerland), Dr. Susan Ermer (Lockheed Martin Lockheed, Palo Alto, CA), Dr. Fazio Nash (AFRL, Rome, New York), Dr. Geoff Lindsay (US Navy Michelson Laboratory at China Lake, CA), Dr. Warren Herman (Laboratory for Physical Sciences, College Park, MD), Suely Black (NSU), Aswini Pradhan (NSU), Vladmir Gavrilenko (NSU), Liming Dai (Case Western), Antao Chen (Applied Physics Lab, UW at Seattle), Axel Scherer (CalTech), Emily Heckman (Sensor Directorate, AFRL), Attila Szep (Sensor Directorate, AFRL), James Grote (Material Directorate, AFRL).

#### University Teaching Experiences

- 2014 Fall** CHM 701 Advanced Organic Chemistry I  
**2014 Spring** CHEM 792-S02 Topics - Polymer Chemistry, Physics & Materials  
**2013 Fall** CHM 701 Advanced Organic Chemistry I  
**2013 Spring** CHM 328 Organic Chemistry II  
**2012 Fall** CHM 326 Organic Chemistry I  
**2012 Spring** CHM 328 Organic Chemistry II  
**2011 Fall** CHM 326 Organic Chemistry I

**2010 Fall** CHM 322 Organic Chemistry II, CHM322L, CHM 100L (two sessions) and CHM 222L (last one released with funds from a research grant)  
**2010 Spring** CHM100L, CHM452, CHM363L and CHM321 (Org Chem I).  
**2009 Spring** CHM100L Man and Environment Lab; CHM363L Physical Chemistry Lab; CHM452 Chemistry Seminar.  
**2008 Fall** MATS 533 Introduction to Polymers; CHM 481 Special Topics.  
**2008 Spring** CHM 352 & 452 Chemistry Seminar.  
**2007 Fall** MSE 580 Advanced Organic Chemistry; MATS 533 Introduction to Polymers.  
**2007 Spring** CHM 352 & 452 Chemistry Seminar.

**Experiences as a graduate TA:**

**1995 – 97** **Organic Chemistry** (lab & discussion sessions), U. Southern California..  
**1994 – 95** **General Chemistry** (lab & discussion sessions), U. Southern California.

Graduate Students Advised/Mentored

**Ph.D. Students:**

Advised: Manik Gudimani (Fall 2014-), Aubrey Jones (Fall 13-), Eric Nagel (Fall 13-), Logan Sanow (Fall 12-), Juan-Paolo Manalo Octavio (Fall 12 – Dec 2012), Dan Liu (Fall 12-), Jianyuan (Simon) Sun (Fall 11-), Thuong Nguyen (Fall 2009-May 11), Jaleesa Brooks (Fall 2010-May 2011)

Co-Advised: Amanda Harding (Fall 09), Tanya David (Fall 08).

**MS Students:** Thuong Nguyen (defended on 5/2/08, co-advised), Tanya David (defended on 7/14/08), Eric Annih (defended on 6/24/08) Taina Matos (defended in June 2007, co-advised), Meina Wang (defended in July 2005, mentored), James Haliburton (defended in August 2004, mentored).

**Undergraduate Students Mentored**

**2010** Brianna Peeples, Caryn Peeples, Kassimier Haynes, Kim Hodges, Crystal Bell,  
**2009** Lorenzo Parker, Jacquelyn Singletary, Nicole Miller  
**2008** William Harkins (OE Sophomore, Fall, solar cell), Christopher Bouie (OE Sophomore, 2008 Fall, solar cell), Jessica Allen (Chemistry, Summer), Nicole Miller (Chemistry, Summer), Mia Miller (Chemistry, Summer)

Services to the Scientific Community

Reviewer for 2014 Distinguished Thesis Award, Midwestern Association of Graduate Schools.

Judge for 2014 ESDSEF (East South Dakota Science Engineering Fair).

Search committee member, SDSU Physics Department, 2012-13.

Judge for CSGS MASTER'S ETD THESIS AWARD, Conference of Southern Graduate Schools. November, 2008

Manuscripts Reviewing for Chemical Physics Letters, Chemistry of Materials, Marcel Dekker, Solar Energy etc.

Serving on MS thesis committees at Hampton University and NSU.

Serving on PhD.MSE Graduate Curriculum Committee.

Excellence in Serving as a Mentor to STARS Undergraduate Research Program from May 28 to July 18, 2008.

Memberships in Professional Societies:

**ACS** (American Chemical Society), **SPIE, Life Member** (The International Society for Optical Engineers), and **MRS** (Materials Research Society)

Scientific Achievements

**1) First synthesis of ring-protected electro-optic chromophores and first observation of non-conventional dependence of EO coefficient on chromophore concentration. Summer 2010.**

- 2) **The invention of a novel EO polymer CX2 and, for the first time in the EO polymer history, the simultaneous realization of all the major device-critical properties, i.e. low loss, high thermal stability and good poling efficiency in EO modulators made from CX2.**  
 Appl. Phys. Lett. **2005**, 87, paper 061112.  
 News release of Pacific Wave Communications, Ltd. Los Angeles, California, "Major breakthrough in high speed 10 Gbps and 40 Gbps optical modulator technology." Business Wire, Los Angeles, June 18, 2001.  
 SPIE Photonics West Conference 4991, paper 40. 25-31 January 2003, San Jose.
- 3) **Invention of the method to solve photostability of polymer EO devices, and its first demonstration in CLD1/APC electro-optic modulators.**  
 US Patent, 6,616,865 B1, Sept. 9, **2003**.  
 IEEE Journal on Selected Topics in Quantum Electronics, September/October 2001, 7 (5).
- 4) **The first demonstration of EO polymer micro ring resonators in 2002.**  
 "Polymer micro-ring filters and modulators." Payam Rabiei, W. H. Steier, Cheng Zhang, Larry R. Dalton. J. Lightwave Technology, Oct. **2002**.
- 5) **Invention of CLD (Cheng – Larry Dalton) series of second-order nonlinear optical chromophores in years 1998-2000.**  
 Dalton, Larry R.; **Zhang, C.**; et al. "Sterically stabilized second-order nonlinear optical chromophores and devices incorporating the same." U.S. 6,361,717 B1, March 26, **2002**.  
 The current state-of-the-art second order NLO chromophores are still CLDs.
- 6) **Joint invention of the Opto-Chip in 1999.** CLD chromophores made possible the demonstration of the first sub-1 volt electrooptic modulators (opto-chips).  
**Science**, April 7, **2000**. 288, 119-122. "opto-chips shatter records for bandwidth and low voltage," L. Geppart, *IEEE Spectrum*, vol. 37, pp. 28-9 (2000); "Plastic opto-chips offer promise of greater communication bandwidths," R. K. Ackerman, *Signal*, vol. 54, pp. 21-5 (2000); "Rotund molecules key to high-speed telecommunications," R. Dagani, *C&EN News*, vol. 78, pp.12-3 (2000); "Polymers speed electro-optic conversion," K. J. McNaughton, *The Industrial Physicist*, vol. 6, pp. 14 (2000); "Information acceleration," MacNeil, *U.S. News & World Report*, vol. 128, pp. 44 (2000); "Chromophores bulk up for sub 1-volt modulators," Paula Noaker Powell, *Laser Focus World*, vol. 36, pp. 38-40 (2000).]
- 7) **The first realization of low optical loss (1.2 dB/cm at 1.55  $\mu\text{m}$ ) in high- $\mu\beta$  chromophore-doped polymer in 1999-2000.**  
*Chemistry of Materials*, 2001, 13(9), 3043-50. *Applied Physics Letters*. 2000, 76 (24), 3525-7.

On the news:

<http://www.sciencedaily.com/releases/2014/04/140428133753.htm>

## Patents

1. Ring-protected organic chromophores for optoelectronic applications. Cheng Zhang and Qiquan Qiao. IP disclosure filed in June, 2013.
2. **C. Zhang**, H. R. Fetterman, W. Steier, J. Michael. "Sterically stabilized second-order nonlinear optical chromophores with improved stability and devices incorporating the same," US Patent, 6,616,865 B1, Sept. 9, **2003**.
3. Dalton, Larry R.; **Zhang, C.**; Wang, C.; Fetterman, H. R.; Wang, F.; Steier, W.; Harper, A. W.; Ren, A. S.; Michael, J.. "Sterically stabilized second-order nonlinear optical chromophores and devices incorporating the same." U.S. 6,361,717 B1, March 26, **2002**.
4. **C. Zhang**, H. R. Fetterman, W. Steier, J. Michael. "Sterically stabilized polyene-bridged second-order nonlinear optical chromophores and devices incorporating the same." U.S. Patent 6,348,992, February 19, **2002**.
5. **C. Zhang**, H. R. Fetterman, W. Steier, J. Michael. "Polymers containing polyene-bridged second-order nonlinear optical chromophores and devices incorporating the same." **2000**. 6,652,779 November 25, 2003.

6. C. Wang, **C. Zhang**, H. R. Fetterman, W. Steier, J. Michael. "Second-order nonlinear optical chromophores containing dioxine and/or bithiophene as conjugate bridge and devices incorporating the same." U.S. Pat. Appl. Publ. (**2002**), 16 pp., Cont.-in-part of U. S. Ser. No. 488,422.

#### Book Chapter:

Organic and Polymeric Photovoltaic Materials and Devices. Sam-Shajing Sun and Cheng Zhang. Chapter 14 in "Introduction to Organic Electronic and Optoelectronic Materials and Devices", Ed. Sam-Shajing Sun, Larry R. Dalton. CRC Press, 2008.

#### Manuscript in Preparation or Submitted:

1. Shape engineering to promote head-tail interactions of electro-optic chromophores, Cheng Zhang\*, Stephanie J. Benight, Benjamin C. Olbricht, Larry R. Dalton. Manuscript in preparation.
2. Ring-protected small molecules for organic photovoltaics, **Cheng Zhang\***, Swaminathan Venkatesan, Jianyuan Sun, Ashishi Dubey, Ting-Yu Lin, Yu-Chueh Hung, Andrew Sykes, Hongshan He, Qiquan Qiao. Manuscript in preparation.
3. Facile synthesis of a lignin dimer model compound. Dan Liu, Eric Nagel, Cheng Zhang\*, Manuscript in preparation.
4. Photostability Study of Butterfly Chromophore, Jianyuan Sun, Logan P. Sanow, Cheng Zhang\*, Dimitri Deheyn. Manuscript in preparation.
5. "Photovoltaic Performance Enhancement of A Benzodithiophene and Benzothiazole Copolymer and the Effect of Polymer Structure Modification on Morphology and Device Properties", Lal Mohammad, Abu Mitul, Qiliang Chen, Jianyuan Sun, Cheng Zhang,\* Qiquan Qiao\*, Manuscript in preparation.
6. "Study on Photostability of Two Dicyano-Substituted Poly(phenylenevinylenes) with Different Side Chains," Logan P Sanow, Jianyuan Sun, and Cheng Zhang\*, *Journal of Polymer Science A*, **2015**, submitted.
7. "Hybrid-state emission in a polythienylenevinylene derivative with an electron deficient moiety," Evan Lafalce, Xiaomei Jiang, Jianjun Pan, Christi Whittington, Randy Larsen, Logan Sanow, and Cheng Zhang, submitted to *Journal of Chemical Physics* on Dec 5, 2014.

#### Journal Publications:

1. Morphological Evolution and its Impacts on Photovoltaic Performance in Polymer Solar Cells, Devendra Khatiwada, *IEEE Transactions on Electron Devices*, **2015**. Accepted on 1/28/2015.
2. "Critical role of domain crystallinity, domain purity and domain interface sharpness for reduced bimolecular recombination in polymer solar cells," Swaminathan Venkatesan, Jihua Chen, Evan C. Ngo, Ashish Dubey, Devendra Khatiwada, Cheng Zhang, Qiquan Qiao, *Nano Energy* **2015**. [doi:10.1016/j.nanoen.2014.12.027](https://doi.org/10.1016/j.nanoen.2014.12.027)
3. "Development of Low Energy Gap and Fully Regioregular Polythienylenevinylene (PTV) Derivative," Tanya David, Cheng Zhang and Sam-Shajing Sun, *Journal of Chemistry*, **2014**. Article ID 379372. <http://dx.doi.org/10.1155/2014/379372>
4. "Experimental and computational studies of 4H-cyclopenta[2,1-b:3,4-b']dithiophen-4-one (CPDTP)-oligomers," Cheng Zhang, Jianyuan Sun, Qiquan Qiao, and Jing Li. *Polymer*, **2014**, 55, 4677-4683.
5. "Mitsunobu Reactions of Aliphatic Alcohols and Bulky Phenols", Dan Liu, Logan P. Sanow, Cheng Zhang\*. *Tetrahedron Letters*, **2014**, 55, 3090-3092.
6. "Polymer Solar Cells Processed Using Anisole as a Relatively Nontoxic Solvent" Swaminathan Venkatesan, Qiliang Chen, Evan C. Ngo, Nirmal Adhikary, Kelly Nelson, Ashish Dubey, Jianyuan Sun, Venkateswara Bommisetty, Cheng Zhang, David Galipeau, and Qiquan Qiao. *Energy Technology*, **2014**, 2(3), 269-274.
7. "Design, Synthesis, and Characterization of a Novel c-Donor-nc-Bridge-c-Acceptor Type Block Copolymer For Optoelectronic Applications" Sam-Shajing Sun, Jaleesa Brooks, Thuong Nguyen, and Cheng Zhang,\* *J. Polymer Science A*. **2014**, 52, 1149-1160.
8. "Dicyano-Substituted Poly(phenylenevinylene) (DiCNPPV) and the Effect of Cyano Substitution on Photochemical Stability" Jianyuan Sun, Logan P. Sanow, Sam-Shajing Sun and Cheng Zhang. *Macromolecules*, **2013**, 46 (11), pp 4247-4254.
9. "Nanoscale Phase Analysis of Molecular Cooperativity and Thermal Transitions in Dendritic Non-Linear Optical Glasses" Daniel B. Knorr, Jr., Stephanie J. Benight, Brad Krajina, Cheng Zhang, Larry R. Dalton, René M. Overney. *J. Physical Chemistry B*, **2012**, 116(46), 13793-13805.

10. Frontier orbital and morphology engineering of conjugated polymers and block copolymers for potential high efficiency photovoltaics. Sun, Sam-Shajing; Zhang, Cheng; Li, Rui; Nguyen, Thuong; David, Tanya; Brooks, Jaleesa. *Solar Energy Materials & Solar Cells* **2012**, 97, 150-156.
11. Ultrafast optical studies of ordered poly(3-thienylene-vinylene) films. E. Olejnik, B. Pandit, T. Basel, E. Lafalce, C.-X. Sheng, C. Zhang, X. Jiang, and Z. V. Vardeny. *Physical Review B* 85, 235201 (**2012**)
12. "Photophysics and morphology of poly (3-dodecylthienylenevinylene)-[6,6]-phenyl-C61-butyric acid methyl ester composite." E. Lafalce, P. Toglia, C. Zhang and X. Jiang. *Applied Physics Letters* **2012**, 100, 213306.
13. "Regioregularity and Solar Cell Device Performance of Poly(3-dodecylthienylenevinylene)." Jianyuan Sun, Cheng Zhang,\* Swaminathan Venkatesan, Rui Li, Sam-Shajing Sun, and Qiquan Qiao *J. Polym Sci. B: Polymer Physics* **2012**, 50, 917–922.
14. "Synthesis and Characterization of New Sulfone-Derivatized Phenylenevinylene-Based Conjugated Copolymers with Evolving Energy Levels and Gaps" Thuong H. Nguyen, Cheng Zhang, Rui Li, Sam-Shajing Sun. *Journal of Polymer Science: Part A: Polymer Chemistry* **2012**, 50, 1197–1204.
15. "Optical Transmission stability of hybrid sol-gel silica/electrooptic polymer waveguide modulators." Enami, Y.; Hong, J.; Zhang, C.; Luo, J.; Jen, A. K.-Y. *IEEE Photonics Technology Letters* **2011**, 23(20), 1508-1510.
16. "Generation and Recombination Kinetics of Optical Excitations in Poly(3-dodecylthienylenevinylene) with Controlled Regioregularity." Lafalce, Evan; Jiang, Xiaomei; **Zhang, Cheng**. *J. Phys. Chem. B*, **2011**, 115 (45), 13139–13148.
17. "Poly(3-dodecylthienylenevinylene)s: Regioregularity and Crystallinity." **Cheng Zhang**, Jianyuan Sun, Rui Li, Sam-Shajing Sun, Evan Lafalce and Xiaomei Jiang. *Macromolecules*. **2011**, 44(16), 6389-6396.
18. "Poly(3-Dodecyl-2,5-Thienylenevinylene) from the Stille Coupling and the Horner-Emmons Reaction." **Cheng Zhang**, Taina Matos, Rui Li, and Sam-Shajing Sun, Jason E. Lewis, Jian Zhang, Xiaomei Jiang. *Polym. Chem.*, **2010**, 1, 663.
19. "Synthesis and Energy Gap Studies of A Series of Sulfone-Substituted Polyphenylenevinylenes (SF-PPVs)." **Cheng Zhang**, Jianyuan Sun, Rui Li, Suely Black, Sam-Shajing Sun. *Synthetic Metals* **2010**, 160(1-2), 16-21.
20. "Radiation resistance of a gamma-ray irradiated nonlinear optic chromophore." Cheng Zhang and Edward W. Taylor. *J. Nanophotonics*, Nov 19, **2009**, 3, 031860.
21. "Design, Synthesis, Characterization, and Modeling of A Series of S,S-Dioxo-Thienylenevinylene-Based Conjugated Polymers with Evolving Frontier Orbitals." **Cheng Zhang**, Thuong H. Nguyen, Jianyuan Sun, Rui Li, Suely Black, Carl E. Bonner, and Sam-Shajing Sun. *Macromolecules*. **2009**, 42,663-670.
22. "Optical Spectroscopy of PPV-Based Block Copolymers of Nanostructured Supramolecular Organic Semiconductor." Q. Yang, R. Battle, C. Zhang, S. M. Ma, J. T. Seo, B. Tabibi, D. Temple, S. Sun, S. S. Jung, and M. Namkung. *J. Nanosci. Nanotechnol.* 9, 995-999 (**2009**)
23. "Optical Absorption of Poly(thienylenevinylene)-Conjugated Polymers: Experiment and First Principle Theory." Alexander V. Gavrilenko, Taina D. Matos, Carl E. Bonner, S.-S. Sun, **C. Zhang**, and V. I. Gavrilenko. *Journal of Physical Chemistry, C*. **2008**, 112(21), 7908-7912.
24. "Photovoltaic enhancement of organic solar cells by a bridged donor-acceptor block copolymer approach". Sam-Shajing Sun, **Cheng Zhang**, Abram Ledbetter, Soobum Choi, Kang Seo, and Carl E. Bonner, Jr., Martin Drees and Niyazi Serdar Sariciftci. *APL*, **2007**, 90, 043117.
25. "Synthesis of Aldehyde-Capped Polythiophene Containing Electron-Withdrawing Groups via the Ullmann Coupling." **Cheng Zhang** and Sam-Shajing Sun. *Journal of Polymer Science: Part A: Polymer Chemistry*, **2007**, Vol. 45, 41-47.
26. "Design, Synthesis, and Characterization of a -Donor-Bridge-Acceptor-Bridge- Type Block Copolymer via Alkoxy- and Sulfone- Derivatized Poly(phenylenevinylenes)". **Cheng Zhang**, Soobum Choi, James Haliburton, Taina Cleveland, Rui Li, Sam-Shajing Sun, Abram Ledbetter, and Carl E. Bonner *Macromolecules* **2006**, 39, 4317 – 4326.
27. "Optical Properties of Nanostructured Supramolecular Organic Semiconductor" JaeTae Seo, Qiguang Yang, SeongMin Ma, Linwood Creekmore, Russell Battle, Ashley Jackson, Tifney Skyles, Herbert Brown, Bagher Tabibi, Sam-Shajing Sun, **Cheng Zhang**, SungSoo Jung, and Min Namkung. *Journal of Physics: Conference Series* 38 (**2006**) 53–56. 4.
28. Sun, S.; **Zhang, C.**; Haliburton, J.; Ledbetter, A.; Bonner, C.; Drees, M.; Sariciftci, N., "Organic Solar Cell Optimizations in Both Space and Energy Regimes: Large Open Circuit Voltage from a –DBAB-Type Block Copolymer", in *Organic Photovoltaics VI*, **2006**, vol. 5938, 54.



29. "Synthesis and Characterization of a New Acceptor (n-Type) Fluorinated and Terminal-Functionalized Polythiophene." Shanneth Thomas, **Cheng Zhang**, Sam-Shajing Sun. *Journal of Polymer Science: Part A: Polymer Chemistry*, **2005**, Vol. 43, 4280–4287.
30. "Side-chain electro-optic polymer modulator with wide thermal stability ranging from -46 [degree]C to 95 [degree]C for fiber-optic gyroscope applications." Seong-Ku Kim, Yu-Chueh Hung, Byoung-Joon Seo, K. Geary, W. Yuan, B. Bortnik, H. R. Fetterman, C. Wang, W. H. Steier, and **C. Zhang**. *Appl. Phys. Lett.* **2005**, 87, 061112.
31. "Metal-Defined Passive Polymer Optical Waveguides Operating at both 1.31 and 1.55  $\mu$  m Wavelengths." Kim, Seongku; Geary, K.; Yuan, W.; Fetterman, H. R.; Zhang, C.; Wang, C.; Steier, W. H.; Park, G.-C.; Kang, S.-J.; Oh, I.; Jung, W.-J. *Journal of Nonlinear Optical Physics & Materials* **2005**, 14(3), 391-397.
32. "Electro-optic phase modulator using metal-defined polymer optical waveguide." Seong-Ku Kim, W. Yuan, K. Geary, Yu-Chueh Hung, and H. R. Fetterman, Dong-Gun Lee, **C. Zhang**, C. Wang and W. H. Steier, G.-C. Park, S.-J. Kang, and I. Oh. *Appl. Phys. Lett.* **2005**, 87, 011107.
33. "Combined electromagnetic and photoreaction modeling of CLD-1 photobleaching in polymer microring resonators." Yanyi Huang, Joyce K. S. Poon, Wei Liang, and Amnon Yariv (CalTech); **Cheng Zhang**, Larry R. Dalton. *Appl. Phys. Lett.* **2005**, 87(7), 071108/1-071108/3.
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3. Shape engineering to promote head-tail interactions of electro-optic chromophores, Cheng Zhang, Lianjie Zhang, Stephanie J. Benight, Benjamin C. Olbricht, Lewis E. Johnson, Bruce H. Robinson, Robert A. Norwood, Larry R. Dalton. SPIE optics and photonics **2013**, San Diego. Paper 8827-4.
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### Conference –Coauthored Posters or Oral Presentations

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### Lecture/Seminar/Poster Presentations

1. Molecular Engineering of Highly Dipolar Nonlinear Optical Chromophores — Toward taming of electrostatic forces. Brianna N. Peebles, Thuong H. Nguyen, Cheng Zhang. Poster at NSF Center for Integrated Access Network (CIAN) Retreat at Sheraton Hotel, San Jose, November 2-4, 2010.
2. "Organic Electro-Optic Materials for Faster Internet", Cheng Zhang, Seminar at the Center for Materials Research, Norfolk State University, September 17, **2010**.
3. "Introduction to SciFinder Scholar." **Cheng Zhang**, September **2006**. Internal Seminar at the Center for Materials Research, Norfolk State University.
4. "Development of Donor-Bridge-Acceptor Block Copolymer for Photovoltaics" Cheng Zhang. Department of Physics, Hampton University. Host: Prof. Jaetae Seo. September 15<sup>th</sup>, **2006**.
5. "Synthesis and Characterization of DBAB Block Copolymers." **Cheng Zhang**, Internal Seminar at the Center for Materials Research, Norfolk State University. **2005**.

## Graduate Research

- 1994.9-1998.12**      **Advisor:** Prof. Larry R. Dalton, Chemistry Department, U. of Southern California.  
**Ph.D. Thesis:** "Novel Phenylpolyene-Bridged Second-Order Nonlinear Optical Chromophores and New thermally Stable Polyurethanes for Electro-Optic Applications."
- 1991.9-1993.6** Ph. D. Candidate, the State Key Laboratory of Molecular Reaction Dynamics, Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China.  
Advisor: Prof. Guohe Sha. Laser spectroscopy, Molecular reaction dynamics, Nonlinear optics.