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EDUCATION

1983-1988 University of Southern Mississippi, Hattiesburg, MS,
Ph.D. in Polymer Chemistry
1975-1979 National Chung Hsing University, Taiwan, ROC,
B.S. in Chemistry

PROFESSIONAL EXPERIENCE

2004 Member of Ohio Governor's Asia Trade Mission
2003-present Graduate Program Coordinator, Chemical Physics Interdisciplinary Program,
Kent State University
2003.spring Visiting Professor, Eindhoven Polymer Laboratories, Eindhoven University of
Technology and Philips Research Laboratories, Netherlands
2000-present Professor, Chemical Physics Interdisciplinary Program,
Kent State University
1995-2000 Associate Professor, Chemical Physics Interdisciplinary Program,
Kent State University
1989-1995 Senior Research Fellow, Liquid Crystal Institute, Kent State University
1988-1989 Postdoctoral Fellow, Liquid Crystal Institute, Kent State University
1981-1983 Engineer, Nalco Chemical Company, Taiwan
1979-1981 Military Service, Taiwan, ROC

HONORS AND RECOGNITIONS

2008 Fellow, SPIE-International Society for Optical Engineering
2007 Elected Vice-Chair (2009) and Chair (2011) of Liquid Crystals Symposium of Gordon
Research Conference
2004-present. Associate Editor, IEEE/LEOS Journal of Display Technology

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

2004 Establish the Annual Liquid Crystal Day (www.lcday.kent.edu) at Kent State
University
2003-present Advisor for Materials Research Society, KSU Student Chapter
2008 Program Committee, 2008 International Meeting on Information Displays,
Seoul, Korea.
2008 Conference Chair, "Emerging Liquid Crystal Technologies III," SPIE
Photonics West 2008, San Jose, CA.
2007 Program Committee, International Symposium for Flexible Electronics and
Display (ISFED). Hsin-chu, Taiwan, Dec, 17-18, 2007
2007 Program Committee, 2007 International Meeting on Information Displays,

- Dague, Korea.
- 2007 Seminar Moderator, Monday Seminar on Organic Light Emitting Displays, 2007 Society of Information Displays, Long Beach, CA.
- 2007 Conference Chair, "Emerging Liquid Crystal Technologies II," SPIE Photonics West 2007, San Jose, CA.
- 2006 Program Committee, International Symposium for Flexible Electronics and Display (ISFED). Hsinchu, Taiwan, Nov. 8-9, 2006
- 2006 Conference Chair, "Liquid Crystal Materials, Devices and Applications XI," SPIE Photonics West 2006, San Jose, CA.
- 2005 Symposium Chair, 2nd Liquid Crystal Day at Kent State University
- 2005 Program Committee, International Display Manufacturing Conference, Taipei, Taiwan, R.O.C.
- 2005 Symposium Chair, "Emerging Liquid Crystal Technologies", 2005 Photonics West Conference, San Jose, CA.
- 2004 Symposium Chair, 1st Liquid Crystal Day at Kent State University
- 2004 Conference Chair, "Liquid Crystal Materials, Devices, and Applications X," SPIE Photonics West 2004, San Jose, CA.
- 2003.9 Originator, Liquid Crystal Day Conference at Kent State University
- 2003.9 Symposium Chair, "Nanostructured Liquid Crystal Materials and Applications," 2003 Polymeric Materials Science and Engineering, ACS Fall, New York.
- 2003 Conference Chair, "Liquid Crystal Materials, Devices, and Applications IX," SPIE/IS&T Electronic Imaging Science and Technology 2002, San Jose, CA.
- 2002 Conference Chair, "Liquid Crystal Materials, Devices, and Applications VIII," SPIE/IS&T Electronic Imaging Science and Technology 2002, San Jose, CA.
- 2002 Program Committee, "Organic Photonic Materials and Devices IV," SPIE Photonic West 2002, San Jose, CA.
- 2001 Program Committee, The 8th Ferroelectric Liquid Crystal Conference, Washington D.C.
- 2001 Program Committee, "Organic Photonic Materials and Devices III," SPIE Photonic West 2001, San Jose, CA.
- 1999.4 Symposium Chair, "Liquid Crystal Materials and Devices," MRS Spring Meeting, San Francisco, CA
- 1998.8 Program Committee, "Display Conference: Display Technologies II," SPIE 3421, Taipei, Taiwan.
- 1996.6 Scientific and Local Organizing Committee, "16th International Liquid Crystal Conference," Kent, OH.
- 1995.5 Symposium Chair, "Liquid Crystals and Polymers," ACS Regional Meeting and Akron Polymer Conference.
- Member of: The International Society for Optical Engineering, The Optical Society of America, The Society of Information Displays, International Liquid Crystal Society, American Physical Society, and Materials Research Society

ISSUED PATENTS

1. 7,351,506 2008 Polymerization-Encapsulated Cholesteric Liquid Crsytal for Bistable Reflective Displays," T. Schneider, F. Nicholson, L.-C. Chien
2. 7,170,481 2007 "Single substrate liquid crystal display," J. W. Doane, A. A. Khan, I. Shiyanovskaya, T. Schneider, O. Pishnyak, S. E. Green, F. N. Nicholson, L.-C. Chien

3. 7,038,743 2006 "Electro-optical devices from polymer-stabilized liquid crystal molecules," L. Komitov, L.-C. Chien, S. Kim
4. 7,090,901 2006 "Method of making optical compensation film using polymer stabilization technique," L.-C. Chien, T. Doi.
5. 6,939,587 2005 "Fabrication of Aligned Liquid Crystal Cell/Film by Simultaneous Alignment and Phase Separation," S. Kumar, L.-C. Chien, J.-H. Kim
6. 6,924,009 2004 "Electro-Optical Devices from Banana-Shaped Liquid Crystals", A. Jakli, L.C. Chien, D. Krueke, H. Swade, G. Heppke
7. 6,822,713 2004 "Optical compensation film for liquid crystal displays," O. Yaroschuk, J. Kelly, L. Chien, U. Reznikov
8. 6,656,384 2003 "Production of Filaments via Phase Separation and Polymerization," P. Palfy-Muhoray, L.-C. Chien, G. Hu
9. WO 2002 "Electro-optical Devices from Banana-Shaped Liquid Crystals," A. Jakli, L.C. Chien, D. Krueke, H. Sawade, G. Heppke
02/34861
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10. 6,104,448 2000 "Pressure Sensitive Liquid Crystalline Light Modulating Device and Material," J.W. Doane, D.K. Yang and L.-C. Chien
11. 5,695,682 1997 "Liquid Crystalline Light Modulating Device," J.W. Doane, D.K. Yang and L.-C. Chien,
12. 5,691,795 1997 "Polymer Stabilized Liquid Crystalline Light Modulators," J.W. Doane, D.K. Yang and L.C. Chien
13. 5,668,614 1997 "Pixelized Liquid Crystal Displays Materials," L.C. Chien and J.W. Doane.
14. 5,437,811 1995 "Liquid Crystalline Light Modulating Device and Material," J.W. Doane, D.K. Yang and L.C. Chien.
15. PCT/US/92- 1995 "Cholesteric Liquid Crystal/Polymer Display Light Shutter,"
0354;
PCT/US/92-
09367;
CHINA/92210
3952.2;
ISRAEL/1017
66;
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J.W. Doane, L.C. Chien and D.K. Yang

BOOKS AND PROCEEDINGS

1. "Emerging Liquid Crystal Technologies III," L. C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 6911, 2008.
2. "Emerging Liquid Crystal Technologies II," L. C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 6487, 2007.
3. "Liquid Crystal Materials, Devices and Applications XI", L. C. Chien and M. Wu, 2006.SPIE Proceedings V.6135.
4. "Emerging Liquid Crystal Technologies I," L. C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 5741, 2005.
5. "Liquid Crystal Materials, Devices and Applications X" L.C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 5289A/B, 2004.
6. "Liquid Crystal Materials, Devices and Applications IX" L.C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 5003, 2003.
7. "Liquid Crystal Materials, Devices and Applications VIII" L.C. Chien, The Proceeding of International Society for Optical Engineering, Vol. 4658, 2002.

8. "Liquid Crystal Materials and Devices," T. J. Bunning, S.H. Chen, L.C. Chien, T. Kajiyama, N. Koide, S.C. A. Lien, eds., Materials Research Society Symposium, Series, Vol. 559, Warrendale, PA, 1999.

BOOK CHAPTERS

1. "Spatially-ordered polymers self-assembled in ordered liquid crystal templates," L.C. Chien, C.O. Catanescu, L. Li, in "Crosslinked Liquid Crystalline Systems: From Rigid Polymer Networks to Elastomers," D. Broer, G.P. Crawford, and S. Zumer, Eds., Taylor and Francis. (2008).
2. "Synthesis and Characterization of Novel Chiral Chromophores for Nonlinear Optical Applications," S. Wang, K.D. Singer, R.G. Petschek, S. Huang, L.C. Chien, in ACS symposium series 795, "Optical Polymers: Fibers and Waveguides" J. P. Harmon and G. K. Noren, Chapter 6, 77-89 (2001).
3. "Liquid Crystals and Polymers," L.C. Chien in "Liquid Crystals Interactive" CD-ROM Education Software, S. Abeygunatharaman ed., IO Graphics, Kent, OH (1998).
4. "Morphology of Composites of Low-Molar-Mass Liquid Crystals and Polymer Networks," C.V. Rajaram, S.D. Hudson, and L.C. Chien, in ACS symposium series 672, "Photonic and Optoelectronic Polymers" S.A. Jenekhe and K.J. Wynne eds., Chapter 34, 507 (1997).
5. "Recent Advances in Materials for Polymer Stabilized Liquid Crystals," L.-C. Chien, M.N. Boyden, A.J. Walz, and C.M. Citano, in ACS symposium series 632 "Recent Advances in Liquid Crystalline Polymers," A.I. Isayev, eds., Chapter 11, p. 182 (1996).
6. "Polymer Stabilized Cholesteric Textures: Materials and Applications," D.K. Yang and L.C. Chien, in "*Liquid Crystals in Complex Geometries*," ed. G.P. Crawford and S. Zumer, Taylor and Francis Publisher, London, Chapter 3, (1996).

REFERRED PUBLICATIONS

1. S.-Y. Lu and L.-C. Chien, "Carbon nanotube doped liquid crystal OCB cells: physical and electro-optical properties," *Optics Express*, **16**, 12777-12785 (2008).
2. N. Kim, J. Choi, L.-C. Chien, T. Kyu, "Phase equilibrium of mixture of side-chain liquid crystalline polymer and low molecular mass liquid crystal," *Macromolecules*, **40**, 9582-9589 (2008).
3. S.-Y. Lu, L.-C. Chien, "A polymer-stabilized single layer color cholesteric liquid crystal display with anisotropic reflection," *Appl. Phys. Lett.* **91**, 131119-131119-3 (2007).
4. S.-W. Kang, L.-C. Chien, "Field-induced and polymer-stabilized two-dimensional cholesteric liquid crystal gratings," *Appl. Phys. Lett.* **90**, 21110/1-221110/3 (2007).
5. S. Abeygunaratne, L.-C. Chien, V. Vill, "Tilted supramolecular structures of amphiphilic glycolipids in straight-core smectic C liquid crystals," *Liq. Cryst.*, **34**, 441-445 (2007).
6. S. Gauza, Y. Zhao, T. Le Cor, S.-T. Wu, J. Dziaduszek, G. Sadrnouski, R. Dabrowski, L.-C. Chien, "Enhancing birefringence by doping fluorinated phenyltolanes," *J. Displ. Tech.*, **2**, 327-332 (2006).
7. S.-W. Kang, S. Sprunt, L.-C. Chen, "Polymer-Stabilized Cholesteric Diffraction Gratings: Effects of UV Wavelength on Polymer Morphology and Electrooptic Properties," *Chem. Mater.* **18**, 4436-4441 (2006).

8. C. O. Catanescu, L.C. Chien, "High birefringence difluoroisothiocyanate biphenyl tolane liquid crystals," *Liq. Cryst.* **33**, 115-120 (2006).
9. O. Yaroshchuk, T. Bidna, O. Nadтока, L. Olkhovyyk, V. Syromyatnikov, L.C. Chien, "The initial and photoinduced 3D orientation order in polymethacrylates with azobenzene side groups," *Mol. Cryst. Liq. Cryst.* **437**, 1377-1390 (2005).
10. L.R. Manuel, L.G. Cada, L.C. Chien, "Synthesis and physical properties of difluoroterphenyl ferroelectric liquid crystal with mixed alkenyloxy-ester terminal ends," *Liq. Cryst.* **32**, 163-172 (2005).
11. S. H. Kim, L. Komitov, L. C. Chien, "Short pitch cholesteric electro-optical device stabilized by nonuniform polymer network", *Appl. Phys. Lett.*, **86**, 161118/1-161118/3 (2005).
12. C. O. Catanescu, L.C. Chien, "Patterning a Poly(3,4-ethylenedioxythiophene) Thin Film Using a Liquid Crystalline Network," *Adv. Mater.* **17**, 305 – 309 (2005).
13. S. H. Kim, L.C. Chien, "Electro-optical Characteristics and Morphology of a Bend Nematic Liquid Crystal Device Having Templated Polymer Fibrils," *J. Jpn. Appl. Phys.* **43**, 7643-7647 (2004).
14. O. Yaroshchuk,; Yu. Zakrevskyy, S. Kumar, J. Kelly, L.-C. Chien, J. Lindau, "Three-dimensional orientational order in the bulk and on the surface of polymer films and its effect on liquid-crystal alignment," *Phys. Rev. E*: **69(1-1)**, 011702/1-011702/7 (2004).
15. S.W. Kang, S.H. Jin, L.C. Chien and S. Sprunt, "Spatial and Orientational Templating of Semiconducting Polymers in a Cholesteric Liquid Crystal," *Adv. Funct. Matter.* **14**, 329-334 (2004).
16. C. O Catanescu, S. T. Wu, L. C. Chien, "Tailoring the physical properties of some high birefringence isothiocyanato-based liquid crystals," *Liquid Crystals*, **31**, 541-555 (2004).
17. S. H. Kim, L. C. Chien, "Liquid crystal blazed gratings formed in a single-step through photo-induced localization of polymer into a prismatic structure," *Optical Express*, **12**, 1238-1242 (2004).
18. S. N. Lee and L.-C. Chien, "The Effect of Polymer Networks on Ferroelectric Liquid Crystals," *Mol. Cryst. Liq. Cryst.* **410**, 183-190 (2004).
19. C. O. Catanescu and L. C. Chien, "High Birefringence Nematic Liquid Crystals for Display and Telecom Applications," *Mol. Cryst. Liq. Cryst.* **411**, 93-102 (2004).
20. T. Sergan, J. Kelly, O. Yaroshchuk, L. C. Chien, "Negative Birefringence Films from Non-Traditional Materials," *Mol. Cryst. Liq. Cryst.* **409**, 153-162 (2004).
21. E. J. Choi, J. C. Ahn, L.-C. Chien, C.-K. Lee, W.-C. Zin, D.-C. Kim and S.-T. Kim, "Main Chain Polymers Containing Banana-Shaped Mesogens: Synthesis and Mesomorphic Properties," *Macromolecules*, **37**, 71-78 (2004).
22. J. B. Baek and L.-C. Chien, "Synthesis and Photoluminescence of Linear and Hyperbranched Polyethers Containing Phenylquinoxaline Units and Flexible Aliphatic Spacers," *J. Polym. Sci. A, Polym. Chem.* **42**, 3587 (2004).
23. Q. Wang, L.-C. Chien, S. Kumar, "Formation and localization of internal polymer columnar structures in liquid crystal cells," *Appl. Phys. Lett.* **83**, 3698-3700 (2003).
24. R. Kaafarani, B. Wex, F. Wang, O. Catanescu, L. C. Chien, D. C. Neckers, "Synthesis of highly fluorescent Y-Enyne dendrimers with Four and Six arms," *J. of Org. Chem.* **68(13)**, 5377-5380 (2003).
25. S. Suresh, L. C. Chien, "Electro-optical properties of polymer-stabilized ferroelectric liquid crystal," *Ferroelectrics*, **287**, 1-6 (2003).
26. C.-K. Lee, S.-S. Kwon, T.-S. Kim, W.-C. Zin, D.-C. Kim, E.-S.-T. Shin, J.-H. Song, E.-J. Choi, L.-C. Chien, "Mesomorphic properties of achiral halogen-substituted banana-shaped compounds," *Liquid Crystals*, **30**, 415-421 (2003).
27. S.-K. Kwon, T.-S. Kim, C.-K. Lee, S.-T. Shin, L.-T. Oh, E.-J. Choi, S.-Y. Kim, L.-C.

- Chien. "Ferroelectric liquid crystals from bent-core molecules with vinyl end groups," *Bull. of the Korean Chem. Soc.*, **24**, 274-278 (2003)
28. O. V. Yaroshchuk, A. D. Kiselev, A. D.; Yu. Zakrevskyy, T. Bidna, J. Kelly, L.-C. Chien, J. Lindau, "Photoinduced three-dimensional orientational order in side chain liquid crystalline azopolymers," *Condensed Matter* 1-28, (2003).
 29. C.-K. Lee, S.-S. Kwon, T.-S. Kim, E.-J. Choi, S.-T. Shin, W.-C. Zin, D.-C. Kim, J.-H. Kim, L.-C. Chien, "Synthesis and properties of new materials with banana-shaped achiral cores and chiral end groups," *Liquid Crystals*, **30**(12), 1401-1406 (2003).
 30. O. V. Yaroshchuk, A. D.; Kiselev, Yu. Zakrevskyy, T. Bidna, J. Kelly, L.-C. Chien, J. Lindau, "Photoinduced three-dimensional orientational order in side chain liquid crystalline azopolymers," *Physical Review E* **68**, 011803/1-011803/15 (2003).
 31. D.A. Coleman, J. Fernsler, N. Chattham, M. Nakata, Y. Takanishi, D.R. Link, R.F. Shao, W.G. Jang, J.E. Maclennan, E. Korblova, O. Mondain, C. Boyer, W. Weissflog, G. Pelzl, L.-C. Chien, D.M. Walba, J. Zasadzinski, J. Watanabe, H. Takezoe and N.A. Clark, "Polarization-modulated smectic liquid crystal phases," *Science* **301**, 1204-1211 (2003).
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 33. L.C. Chien, M. Boyden, A. Walz, I. Shenouda, C. Citano, *Macromol.* "Polymerization in Self-organizing Systems," *Synthesis*. **12**, 23-34 (2002).
 34. C.-K. Lee, S.-K. Kwon, S.-T. Shin, E.-J. Choi, S. Lee, L.-C. Chien, "Ferroelectric liquid crystals from banana-shaped achiral molecules with vinyl end groups," *Liq. Cryst.* **29**, 1007 (2002).
 35. C.Y. Li, S. Jin, X. Weng, J.J. Ge, D. Zhang, F. Bai, F.W. Harris, S.Z.D. Cheng, D. Yang, T. He, L.-C. Chien and B. Lotz, "Liquid crystalline phases, microtwinning in crystals and helical chirality transformations in a main-chain chiral liquid crystalline," *Macromolecules*, **35**, 5475 (2002).
 36. K.G. Kang, L.C. Chien, S. Sprunt, "Polymer-stabilized cholesteric liquid crystal microgratings: a comparison of polymer network formation and electro-optic properties for mesogenic and non-mesogenic monomers," *Liq. Cryst.* **29**, 9-18 (2002).
 37. A. Jakli, G.G. Nair, S. Abeygunarartna, R.P. Sun, C.K. Lee, L.-C. Chien, "Surface effects on liquid crystals of bent-shaped molecules," *Ferroelectrics* **276**, 135 (2002).
 38. A. Jakli, L.-C. Chien, D. Krueker, H. Sawade, G. Heppke, "Light shutters from antiferroelectric liquid crystals of bent-shaped molecules," *Liq. Cryst.*, **29**, 377-381 (2002).
 39. Y. Zakrevskyy, O. Yaroshchuk, J. Kelly, L.C. Chien, J. Lindau, "3D orientational order in the photoaligning polymer films and its correlation with LC alignment," *Mol. Cryst. Liq. Cryst.* **375**, 769-783 (2002).
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- pattern forming states of a cholesteric liquid crystal as templates,” *Adv. Mater.*, **13**, 1179 (2001).
45. S.W. Kang, Sprunt and L.C. Chien, “Switchable diffraction gratings based on inversion of the dielectric anisotropy in nematic liquid crystals,” *Appl. Phys. Lett.*, **78**, 3782 (2001).
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 51. C.Y. Li, S.Z.D. Cheng, X. Weng, J. J. Ge, F. Bai, J.Z. Zhang, B.H. Calhoun, F. W. Harris, L.-C. Chien and B. Lotz, “Left or Right, It is a Matter of One Methylene Unit,” *J. Am. Chem. Soc.*, **123**, 2462 (2001).
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 53. “Electro-disclinc Effect in Tilted Smectic Phases of Banana-Shaped Liquid Crystal Materials,” A. Jakli, G.G. Nair, C.K. Lee, L.C. Chien, *Liq. Cryst.*, **28**, 489-494 (2001).
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 59. C.K. Lee and L.C. Chien, “Helical Superstructure from an Achiral Banana-shaped Liquid Crystal,” *Ferroelectrics*, **243**, 231-237 (2000).
 60. V. Ostroverkhov, R.G. Petschek, K.D. Singer, L. Sukhomlinova, R.J. Twieg, S.-X. Wang, and L.C. Chien, “Measurements of the Hyperpolarizability Tensor Using Hyper-Rayleigh Scattering” *J. Opt. Soc. Am. B* **17**, 1531-1542 (2000).
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- Crysta Host," *Liq. Cryst.*, **27**, 359 (2000)
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 101. "Synthesis and Properties of Diacetylenic Liquid Crystals," I.G. Shenouda and L.C. Chien, *Polymer Preprints*, **33**(1), 1048-1049 (1992).
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 103. "Synthesis and Properties of Diacetylene Liquid Crystalline Monomers," I. Shenouda and L.C. Chien, *ALCOM Technical Report on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects*, **2**, 241 (1991).
 104. "Synthesis and properties of Amine-Containing Liquid Crystals," L.G. Cada, L. Xie and L.C. Chien, *ALCOM Technical Report on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects*, **2**, 234 (1991)
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 106. "Liquid Crystalline Epoxies for PDLC Applications," L.C. Chien, *ALCOM Technical Report on Dispersions of Liquid Crystal and Polymers*, **1**, 74 (1991).
 107. "Cholesteric Liquid Crystal/Polymer Gel Dispersion Normal-Mode and Reverse-Mode Haze-Free Light Shutters," D.Yang, J.W. Doane and L.C. Chien, *ALCOM Technical Report on Dispersions of Liquid Crystal and Polymers*, **1**, 67 (1991).
 108. "Cholesteric Liquid Crystal/Polymer Gel Dispersion Bistable at Zero Field," D.Yang, J.W. Doane and L.C. Chien, *ALCOM Technical Report on Dispersions of Liquid Crystal and Polymers*, **1**, 57 (1991).
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INVITED LECTURES

1. "Flexible Liquid Crystal Displays Using Combined Polymers and Liquid Crystals," Polymers in Flat Panel Display Technologies Symposium, 236th ACS National Meeting and Exposition, Philadelphia, PA, August 17-21, 2008.

2. "Recent Advances in Color Cholesteric Liquid Crystal Technologies for E-paper Displays," Frontier Topology and Design Concept for Neo-Mesomorphism Conference, Kumoh National Institute of Technology, Gumi, Korea, July 4-7, 2008.
3. "Flexible Displays Using Combined Polymers and Liquid Crystals," New Horizons of Liquid Crystal Science and Application II Conference, Chungbuk National University, Chungju, Korea, June 27-28, 2008.
4. "Ups and Downs of Flexible Displays," Innolux, Inc., Chunang, Taiwan, Jun 23, 2008.
5. "A Photochromic Main-Chain Liquid Crystalline Polymer and Its Photo-stimulated Actuating Properties," M.-H. Lee, H.J. Choi, K.-U., Jeong, L.-C. Chien, Emerging Liquid Crystal Technologies III Conference at SPIE 2008 Photonics West, Jan. 19-24, 2008.
6. "The Combination of Phase-Separated Polymers and Liquid Crystals for Display and Photonic Applications," 2008 International symposium on Nano Structured Polymers (a sub-symposium of 2008 Annual Meeting of the Polymer Society, Taipei, Taiwan, Jan. 18-20, 2008.
7. "Optical Compensation Films for Wide Viewing Angle LCDs," Department of Applied Chemistry, National Chiao Tung University, Hsin-Chu, Taiwan, Jan 17, 2008.
8. "Liquid Crystal Composites and Thin Optical Films," Department of Physics, Chung Yuan Christian Univ., Chung-Li, Taiwan, Jan. 2, 2008.
9. "Flexible Displays Using Polymer and Liquid Crystal Composites," 2007 Taiwan Liquid Crystal Conference Annual Meeting, Chung Yuan Christian Univ., Chung-Li, Taiwan, Dec. 28, 2007.
10. "Polymer/Liquid Crystal Composites for Flexible Displays," 2007 Flexible Displays and Components Workshop, National Cheng Kung University, Tainan, Taiwan, Nov. 19-21, 2007.
11. "Flexible e-Paper Displays," Department of Materials Science, Fudan University, Shanghai, China, Oct. 19, 2007.
12. "Bistable Reflective Displays for Paper-like Displays," Asia Optical Fiber Communication & Optoelectronic Exposition & Conference (AOE), Shanghai, China, Oct. 17-19, 2007.
13. "Single-Layer Color Cholesteric Liquid Crystal Displays," S.-Y. Lu, Y.-h. Lin, and L.-C. Chien, 2007 International Meeting on Information Displays, Daegu, Korea, Aug. 27-31, 2008.
14. "Dynamics and morphology of phase-separated polymers using liquid crystal templates," NSF Sponsored Ferroelectric Phenomena in Liquid Crystals Workshop, LCI, Kent, June 19-28, 2007.
15. "Conductive Liquid Crystalline Elastomers for Aircraft Wing Structure Applications," 2007 CRG Annual Technology Conference, Dayton, Ohio. May, 18 2007.
16. "Recent Advance in Color Cholesteric Displays," 2006 Taiwan Liquid Crystal Society Annual Meeting, Tainan, Taiwan, December 22, 2006.
17. "Dynamic and Morphose Separation of Liquid Crystal Templated Polymers," Department of Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan, December 23, 2006.
18. "Polymer and Liquid Crystal Composites for Optical and Electro-Optical Applications," Display Institute, National Chiao Tung University, Hsinchu, Taiwan, December 23, 2006.
19. "Full Color Reflective Cholesteric Displays," Technical Meeting on Flexible Displays, Industrial Technology Research Institute, Taiwan, October 16-18, 2006.
20. "Bistable Reflective Displays for Paper-Like Displays," 2006 Moden Engineering and Technology Seminar: Flat Panel Displays and Optoelectronics Technology, Taipei, Taiwan, Sept. 22-27, 2006.
21. "High Birefringence Nematics for Spatial Light Modulators," SPIE Great Lakes Photonics Symposium, June 12-16, 2006.

22. "Fast-Switching Flexoelectric Cholesteric Liquid Crystal Displays," SPIE Defense & Security Symposium, Orlando, FL, April 17-21, 2006.
23. "Liquid Crystal Templated Spatially Ordered Conductive Polymers," Singapore International Chemical Conference IV (SICC-4), Singapore, Dec. 8-10, 2005.
24. "Liquid Crystal Displays Using Continuous Fabrication Process", Technical Meeting on Flexible Displays Forum, Industrial Technology Research Institute, Taiwan, November , 23, 2005.
25. "Polymer-Stabilized Dual-Frequency Switchable Flexoelectric Cholesteric Displays," Samsung Electronic Corporation, Suwon, Korea, August 27, 2005.
26. "Fast Switching Flexoelectric Cholesteric Devices", 2005 International Meeting on Information Displays, Seoul, Korea, July 19, 2005.
27. "Flexible Displays using Phase-Separated Polymer Columns", 2005 Flat Panel Displays Technical Meeting, Industrial Technology Research Institute, Taiwan, February, 23, 2005.
28. "Liquid Crystal Controlled Polymer Morphologies and Device Applications", Department of Physics, California State University, Sacramento, CA, January 28, 2005.
29. "Fast-switching Liquid Crystal Displays from Banana-shaped Liquid Crystals," 2004 Taiwan Liquid Crystal Society Annual Meeting, December 18, 2004, Taipei, Taiwan.
30. "Liquid Crystal Templated Ordered Polymers and Device Applications", Macro-2004, Thiruvananthapuram, India, Dec. 15-17, 2004.
31. "Liquid Crystal Controlled Conductive Polymer Morphologies", Materials Science and Engineering, National Chiao Tung University, Hsinchu, Taiwan, Dec. 21, 2004.
32. "Fast-switching Liquid Crystal Displays from Banana-shaped Liquid Crystals," 2004 Taiwan Liquid Crystal Society Annual Meeting, December 18, 2004, Taipei, Taiwan.
33. "Liquid Crystal Templated Ordered Polymers and Device Applications", Macro-2004, Thiruvananthapuram, India, Dec. 15-17, 2004.
34. "Polymer Stabilized Cholesteric Liquid Crystals and Electro-optical Devices Containing Them," MRS Fall 2004, Boston, MA, Nov. 30, 2004.
35. "Fast-Switching Flexoelectric Cholesteric Liquid Crystal Devices," 21st Century COE International Symposium on LCDs and Related Materials, Tokyo Univ. of A&T, Tokyo, Japan, Sept. 28, 2004.
36. "Polymer-Stabilized Bend Nematic Displays," Samsung Electronic Corporation, Suwon, Korea, August 27, 2004.
37. "Polymer Stabilized Liquid Crystal Displays: Recent Advances," AU Optonics Corporation, Hsinchu, Taiwan, August 12, 2004.
38. "Polymer-Stabilized Cholesteric Liquid Crystal Electro-Optical Devices," Electronic Research Service Organization, Industrial Technology Research Institute, Taiwan, August, 11, 2004.
39. "Polymer-Stabilized Flexoelectric Liquid Crystal Devices," HannStar Electronic Corporation, Tao-Yuan, Taiwan, August 9, 2004.
40. "Optical diffraction from polymer-stabilized liquid crystal phase gratings," Great Lakes Photonics Symposium, Cleveland, OH, June 7-11, 2004.
41. "Polymer-Enhanced LCDs," 2004 LEOS/IEEE Annual Meeting, Tuscon, Arizona, October 26-30, 2003.
42. "Liquid crystal controlled polymer morphology," Polymeric Materials Science and Engineering Symposium on "Nanostructured Liquid Crystal/Polymer Materials and Applications," ACS Fall 2003, New York City, New York.
43. "Liquid Crystal Templated Ordered Polymers and Applications," Kongku University, July 12, 2003, Seoul, South Korea.
44. "High Birefringence Liquid Crystals," *IMID 2003*, Daejeon, South Korea, July 9-11, 2003.
45. "Liquid Crystal Controlled Ordered Polymer Architectures," University of Siegen, Siegen, Germany, April 29, 2003.

46. "Polymer-Enhanced Liquid Crystal Displays," Technische University of Darmstadt, Darmstadt, Germany, April 28, 2003.
47. "Liquid Crystal Controlled Ordered Polymer Architectures," University of Paderborn, Paderborn, Germany, April 25, 2003.
48. "Polymer-Enhanced Liquid Crystal Displays," Fraunhofer Institute of Applied Polymer Research/Max Planck Institute of Colloidals and Interfaces, Golm (Potsdam), Germany, April 24, 2003.
49. "Polymer-Enhanced Liquid Crystal Displays," Samsung Electronic Corporation, TFT-LCD Division, Suwon, Korea, March 20, 2003.
50. "Polymer-Enhanced Liquid Crystal Displays," Philips Research Laboratories, Eindhoven, Netherlands, March 14, 2003.
51. "Liquid Crystal-controlled Polymer Morphologies," Eindhoven Polymer Laboratories, Eindhoven, Netherlands, February 14, 2003.
52. "Polymer-Enhanced Liquid Crystal Displays," Technical Conference, Electronic Research Service Organization, Industrial Technology Research Institute, Hsinchu, Taiwan, February 24-26, 2003.
53. "Light shutters and electro-optical storage devices from antiferroelectric liquid crystals of banana-shaped molecules," Electronic Imaging 2003, Santa Clara, CA, January 21, 2003.
54. "or Display Applications," 2002 Chinese Liquid Crystal Society Annual Meeting, Hsinchu, Taiwan, December 20, 2002.
55. "Anisotropic Gels and Applications," Symposium of "Liquid Crystal Elastomers and Gels" of the 1st World Congress on Biomimetic and Artificial Muscles, December 14-18, 2002, Albuquerque, NM.
56. "Liquid Crystal Alignment and Optical Compensators," Kodak Company, Rochester, NY, November 18, 2002.
57. "Polymer Stabilized Liquid Crystal Devices," Avery Dennison, Pasadena, CA, September 18, 2002.
58. "Fast-Switching Polymer-Stabilized Bend Nematic Devices," *IMID '02*, Daegu, Korea, August 21-23, 2002.
59. "Polymer-Stabilized Analog-Switching Ferroelectric Displays," Seoul National University Seoul, Korea, August 20, 2002.
60. "Analog Switching Ferroelectric Displays," Samsung Corporation, SDI, August 19, 2002.
61. "Imaging Liquid Crystal Templates," 2002 USA-Korea Science and Engineering Conference, Seoul, Korea, July 10-13, 2002.
62. "Micro-Patterned Polymers on Liquid Crystal Templates," 3rd Symposium on Liquid Crystal Materials and LCDs," LCI, Science University of Tokyo-Yamaguchi, Japan, Feb.2-3, 2002.
63. "Imaging Liquid Crystal Templates," 2002 USA-Korea Science and Engineering Conference, Seoul, Korea, July 10-13, 2002.
64. "Micro-Patterned Polymers on Liquid Crystal Templates," 3rd Symposium on Liquid Crystal Materials and LCDs," LCI, Science University of Tokyo-Yamaguchi, Japan, Feb.2-3, 2002.
65. "Polymer-Stabilized Liquid Crystal Displays," Nitto-Denko Incorporation, Onomichi, Hiroshima, Japan, Feb 1, 2002.
66. "Polymer-Stabilized Liquid Crystal Displays," Tosoh Corporation, Yokkaichi-Shi, Mie, Japan, January 31, 2002.
67. "Polymer-Stabilized Cholesteric Diffraction Gratings," International Conference on Advanced Materials 2001, Cancun, Mexico, August 26-30, 2001.
68. "Micro-patterned polymers from cholesteric liquid crystals," 2001 Gordon Research Conference, New London, New Hampshire, June 24-29, 2001.

69. "Ordered Polymer Microstructures formed by Photo-Polymerization on Liquid Crystal Templates," 84th Canadian Society of Chemistry Conference, Montreal, Canada, May 26-30, 2001.
70. "Electrically Switchable, Polymer-Stabilized Liquid Crystal Gratings," National Chiao-Tung University, Hsin-Chu, Taiwan, April 11-12, 2001.
71. "Optimization of the Nonlinear Optical Response in Chiral Media," (presented by K. Singer) Photonic West 2001, San Jose, CA, January 20-26, 2001.
72. "Electrically-Switchable and Polymer-Stabilized Cholesteric Diffraction Gratings," Photonic West 2001, San Jose, CA, January 20-26, 2001.
73. "Advanced Liquid Crystal Photoalignment Materials," 2000 International Chinese Liquid Crystal Conference, Tainan, Taiwan, December 19-20, 2000.
74. "Photo-Polymerized Lyo-discotic Self-assemblies," 2000 International Chemical Congress of Pacific Basin Society, Honolulu, HI, December 14-19, 2000.
75. "Molecular Considerations for Optimizing the Second-Order Nonlinear Optical Response in Chiral Media," Fall 200 ACS National Meeting, Wanshington, DC, August 20-24, 2000.
76. "Electrically-Switchable and Polymer-Stabilized Cholesteric Diffraction Gratings," 2000 SPIE Annual Meetings, San Diego, CA, August 1-3, 2000.
77. "Liquid Crystal Alignment Materials and Photoalignment," Science Research Center, Avery Dennison, Pasadena, CA, July 14, 2000.
78. "Supermolecular Structure, Chirality in Liquid Crystals and Polymers," and "Polymer Stabilized Liquid Crystals and Applications," Department of Chemistry, University of Southern Illinois, Carbondale, IL, April 27-28, 2000.
79. "Super Structures Formed from Liquid Crystal Directed Polymers and Polymer Stabilized Liquid Crystals," Seoul National University, Seoul, Korea, February 17, 2000.
80. "Discotic Films for LCDs," Samsung Electronics, Suwon, Korea, February 15, 2000.
81. "Photoalignment of Liquid Crystals," LG.Philips LCDs, Anyang, Korea, February 16, 2000.
82. "Fabrication and Characterization of Discotic Films," 1999 International Chinese Liquid Crystal and Display Symposium, Hsinchu, Taiwan, December 28, 1999.
83. "Liquid Crystal Directed Polymers and Device Applications," Optical Science Center, University of Arizona, Tucson, AZ, October 28, 1999.
84. "Holographic Formed Polymer Dispersed Liquid Crystal Films," Retinal Displays, Sunnyvale, CA, October 8, 1999.
85. "Anisotropic Photopolymerization and Fluorescence Study of Discotic Materials," Symposium of "Polymers in Display Applications," 218th ACS, New Orleans, Louisiana, Aug22-26, 1999.
86. "Spontaneous Formation of Double-Twisted Helix in a Banana-Shaped Liquid and Isoregic Chiral Smectic C Polyesters," Symposium of "Hydrogen Bonding for Macromolecular Self-Assembly," 218th ACS, New Orleans, Louisiana, Aug22-26, 1999.
87. "Chirality in Liquid Crystals, Polymers, Diffractive Optics and Liquid Crystal Displays," Naval Research Laboratory, Washington DC, April 16, 1998.
88. "Polymer-Stabilized Liquid Crystal Displays," 1998 International Chinese Liquid Crystal Conference, Hsin-Chu, Taiwan, December 28-29, 1998.
89. "Chirality in Liquid Crystals, Polymers, and Liquid Crystal Displays," Department of Chemistry, University of Akron, Akron, Ohio, December 8, 1998.
90. "Formation of Double Twisted Helical Structure from Achiral Liquid Crystals," November ALCOM Banana-Shaped Liquid Crystal Workshop, November, 1998, Kent State Univesity, Kent, Ohio.
91. "Polymers for Thin Film Polarizers and Viewing Angle Improving Films," September 18, 1998, Avery Dennison, Research Center, Pasadena, CA.

92. "Effects of Polymer Network Content in a Liquid Crystal Display," May 28, 1998, Department of Chemistry, Massachusetts Institute of Technology, Cambridge, MA.
93. "Effects of Low-Polymer Content in a Liquid Crystal Display," March 13, 1998, Department of Materials Science and Engineering, Los Angeles, CA.
94. "Effects of Low-Polymer Content in a Liquid Crystal Display," March 13, 1998, Department of Materials Science and Engineering, Los Angeles, CA.
95. "Polymer Stabilized Liquid Crystals and Displays," March 12, 1998, Hughes Research Laboratories, Malibu, CA.
96. "Effects of Low-Polymer Content in a Liquid Crystal Display," Nov. 27, 1997, Department of Chemical Engineering, National Chin-Hua University, Hsin-Chu, Taiwan.
97. "Effects of Low-Polymer Content in a Liquid Crystal Display," Nov. 28, 1997, 2nd Chinese Liquid Crystal Society Annual Meeting, Taipei, Taiwan.
98. "Effects of Low-Polymer Content in a Liquid Crystal Display," Oct. 28, 1997, BFGoodrich Aerospace, Brecksville, OH.
99. "Polymer-Stabilized Cholesteric Liquid Crystals and Displays," 213th ACS Symposium on "Organic and Polymeric Materials for Display Applications, April 12-16, 1997, San Francisco, CA.
100. "Anisotropic Polymer Films for Liquid Crystal Displays," OIS Optical Imaging Systems, Inc., Detroit, MI, March 18, 1997.
101. "Reflective Cholesteric Displays," Wintek Corporation, Taichung, Taiwan, ROC, January 12-16, 2006.
102. "Color Pixlation of Reflective Cholesteric Displays," Institute of Optoelectronic and Department of Electric Engineering, National Taiwan University, Taipei, Taiwan, July 10, 1996.
103. "Color Pixlation of Reflective Cholesteric Displays," 1st International Chinese LCD Symposium, Hsin-Chu, Taiwan, July 8-9, 1996.
104. "New Mesogenic Side-on Systems and Polymer Stabilized Broadband Reflective Displays," 211th ACS Symposium on "Polymers for Special Optical Packing and Displays, New Orleans, LA, March, 1996.
105. "Polymer Stabilized Liquid Crystals: Color Patterning Method and Materials," 211th ACS Symposium on "Liquid-Crystalline Polymers, New Orleans, LA, March, 1996.
106. "Smart Materials for Polymer-Stabilized Reflective Cholesteric Displays," SPIE Symposium on "Smart Materials Technologies and Biomimetics, San Diego, California, February 26, 1996,
107. "Photopolymerizations in Ordered Systems and Display Applications," Departments of Physics and Chemical Engineering, National Cheng Kung University, Tainan, Taiwan, January 5, 1996.
108. "Polymer Stabilized Liquid Crystals and Reflective Cholesteric Displays," Department of Physics, National Chung Cheng University, Chiayi, Taiwan, January 4, 1996.
109. "Photopolymerizations in Self-Ordered Systems," Institute of Chemistry, Academia Sinica, Taipei, Taiwan, January 3, 1996.
110. "Liquid Crystal Materials and Displays Workshop," National Chiao Tung University, Hsingchu, Taiwan, December 26-28, 1995.
111. "Color Pixelization of Cholesteric Materials," L.-C. Chien, F. Vicéntini, Y. Lin and U. Müller, 3rd Color Imaging Conference, Scottsdale, Arizona, Nov. 7-10, 1995.
112. "Photopolymerizations in Self-Organizing Systems," L.-C. Chien, A.J. Walz, M.N. Boyden, I.G. Shenouda and C.M. Citano, 209th ACS National Meetings, Anaheim, CA, Spring Meeting, 1995.
113. "Recent Advances in materials for Polymer Stabilized Liquid Crystals," L.-C. Chien, M.-F. Nabor, U. Muller, N. Leroux, M.N. Boyden, A.J. Walz and C.M. Citano, 209th ACS

- National Meetings, Anaheim, CA, Spring Meeting, 1995.
114. "Photopolymerizations in Self-Organizing Systems," L.-C. Chien, A.J. Walz, M.N. Boyden, I.G. Shenouda and C.M. Citano, *209th ACS National Meetings, Anaheim, CA, 1995*.
 115. "Polymer Stabilized Liquid Crystals and Displays," Department of Chemical Engineering, National Ching-Hua University, Hsing-Chu, Taiwan, November 21, 1994.
 116. "Polymer Stabilized Liquid Crystals and Displays," Department of Chemical Engineering, Tai-Tung Institute of Technology, Taipei, Taiwan, November 23, 1994.
 117. "Polymer Stabilized Liquid Crystals and Displays," Department of Apply Chemistry, National Chiao-Tung University, Hsing-Chu, Taiwan, November 21, 1994.
 118. "Polymer Stabilized Liquid Crystals and Displays," Department of Chemical Engineering, National Cheng-Kung University, Tainan, Taiwan, November 18, 1994.
 119. "Recent Advances in Polymer Stabilized Liquid Crystals for Reflective Displays," IBM Almaden Research Center, November 10, 1994.
 120. "Anisotropic Polymer Binders Dispersed and Modified Liquid Crystals," Department of Macromolecular Science, Fudan University, Shanghai, China, September 13, 1994.
 121. "Polymer Stabilized and Modified Liquid Crystals and Displays," Department of Chemistry, Wuhan University, Wuchang, China, September 12, 1994
 122. "Advances in Polymer/Liquid Crystal Dispersions," Department of Physics, National Cheng-Kung University, Tainan, Taiwan, December 11, 1992.
 123. "Current Development of Polymer/Liquid Crystal Dispersions," Industrial Technology Research Laboratories, Hsing-Chu, Taiwan, December 4, 1992.
 124. "The Science and Applications of Anisotropic Binders in Polymer/Liquid Crystal Dispersions," Ohio Research Colloquium: Excellence at Work, the Center for Photochemical Sciences, Bowling Green, Ohio, October 23, 1992.
 125. "Polymer-Dispersed Liquid Crystals," Office of Naval Research Polymer Program Review, Charleston, South Carolina, April 29, 1992.
 126. "Recent Advances in Polymer Liquid Crystals for Display Application," Department of Chemistry and Polymer Science, University of Southern Mississippi, November 12, 1993.
 127. "Recent Advances in Materials for Polymer Stabilized Displays," National Chung-Cheng University, Chi-Yi, Taiwan, November 3, 1993.
 128. "Current Advances in Polymer Liquid Crystal Dispersions," and "Ferroelectric Liquid Crystal Materials," University of Philippines, Philippines, October 26-30, 1993.
 129. "Current Trends of Polymer/Liquid Crystal Dispersions," Merck Ltd, Poole, England, UK, July 18, 1993.

Contributed Presentations (Oral/Poster)

- 1.
2. "Alignment of Liquid Crystal With Inkjet Printed Polyimide for Flexible LCDs," J-Y. Hwang, L.-C. Chien, 2008 Society of Information Display Conference, Los Angeles, CA, May 18-23, 2008.
3. "Carbon-Nanotube Doped Liquid Crystal OCB Cells: Dielectric and Electro-Optical Properties," S.-Y. Lu, L.-C. Chien, 2008 Society of Information Display Conference , Los Angeles, CA, May 18-23, 2008.
4. "Dynamics and Morphology of Polymer Stabilized Liquid Crystals," L. Li, O. C. Catanescu, L.-C. Chien, Emerging Liquid Crystal Technologies Conference III at SPIE Photonics West 2008, San Jose, CA Jan. 19-24, 2008.
5. "Liquid Crystal Fresnel Lens using a Surface Relief Structure," L.C. Chien, Dong Wang,

- 21st International Liquid Crystal Conference, Keystone, CO, July 2-7, 2006.
6. "A Single Layer Color Cholesteric Liquid Crystal Displays," S.-Y. Lu, L.C. Chien, Colby-Sawyer College New London, NH, June 10-15, 2007.
 7. "Self-assembled High Dielectric Lyotropic Composites for Energy Storage," A. Golovin, L.C. Chien, Colby-Sawyer College New London, NH, June 10-15, 2007.
 8. "High dielectric liquid crystal complex fluids for energy storage," C. Braganza, L. Chien, M. Fisch, R. G. Petschek, L. Guo, Colby-Sawyer College New London, NH, June 10-15, 2007.
 9. "Single-Layer Multicolor Cholesteric Displays," S.-Y. Lu, L.C. Chien, 2007 Society of Information Display Conference, Long Beach, CA, May 19-23, 2007.
 10. "Dielectric constants and energy storage in liquid crystal emulsions," C. Braganza, L. Chien, M. Fisch, R. G. Petschek, L. Guo, 21st International Liquid Crystal Conference, Keystone, CO, July 2-7, 2006.
 11. "Electrically tunable chiral materials for spatial light modulators," S. Y. Lu, L. C. Chien, 21st International Liquid Crystal Conference, Keystone, CO, July 2-7, 2006
 12. "Electrically Switchable Mirrors based on Polymer-Stabilized Cholesteric Liquid Crystals," S.-Y. Lu, L.C. Chien, Emerging Liquid Crystal Technologies Conference II at SPIE Photonics West 2007, San Jose, CA Jan. 20-25, 2007.
 13. "Dual-frequency addressable cholesteric based flexoelectric devices," L. C. Chien, L. Shi, S. H. Kim, 21st International Liquid Crystal Conference, Keystone, CO, July 2-7, 2006.
 14. "Patterning conductive polythiophenes using anisotropic polymer networks," C. O. Catanescu, L. C. Chien, 21st International Liquid Crystal Conference, Keystone, CO, July 2-7, 2006.
 15. "A New Approach to Full Color Cholesteric Liquid Crystal Displays," T. Schneider, J. Harden, L.C. Chien, Asad Kahn, and J. W. Doane, 2006 International Display Research Conference, Kent, Ohio. Sept. 18-21, 2006.
 16. "Polymer-stabilized black and white reflective cholesteric displays," L.C. Chien, N. Leroux, 2006 Society of Information Display Conference, San Francisco, CA, June 4-9, 2006.
 17. "Synthesis and Mesomorphism of Polymer with Banana-shaped Mesogens in the Main-Chain," E.-J. Choi, W.-C. Zin, Y. C. Kim, S.-H. Paek, L.-C. Chien, E. T. Samulski, 2006 International Meeting on Information Displays, Daegu, Korea, Aug. 22-25, 2006.
 18. "Electrically Tunable Chiral Materials for Spatial Light Modulators," S.-Y. Lu, L.C. Chien, APS March Meeting, Baltimore, MD, March 13-17, 2006.
 19. "Liquid Crystal Fresnel Lens using a Surface Relief Structure", D. Wang, L. C. Chien, Liquid Crystal Materials, Devices and Applications XII, Photonics West 2008, San Jose, Jan. 21-26, 2006.
 20. "Dual-frequency switchable flexoelectric cholesteric devices," S.H. Kim, L. Shi, L.C. Chien, 2005 International Meeting on Information Displays, Seoul, Korea, July 19-23, 2005.
 21. "The Effect of Molecular Orientational Order on the Polymerization of 3,4-Ethylenedioxythiophene", C. Otilia Catanescu, X. Zhou, L. C. Chien, 2004 MRS Fall Meeting, Boston, MA, Nov.29-Dec.3, 2004.
 22. "Liquid Crystal Controlled Polymer Morphologies", X. Zhou, L. C. Chien, D. Broer,

- 2004 MRS Fall Meeting, Boston, MA, Nov.29-Dec.3, 2004.
23. "Surfaced Modified Liquid Crystal Lens", D. Wang, L. C. Chien, 2004 MRS Fall Meeting, Boston, MA, Nov.29-Dec.3, 2004.
 24. "Electro-optical Devices from Surface-Stabilized Cholesteric ULH Structure with Dual Mode Switching", S. H. Kim, L.C. Chien and L. Komitov, 2004 MRS Fall Meeting, Boston, MA, Nov.29-Dec.3, 2004.
 25. "Electro-optical Devices from Polymer-stabilized Molecular Shape Polarity of a Cholesteric Liquid Crystal", S.H. Kim, L.C. Chien, and L. Komitov, 2004 Society of Information Display Conference, *SID Digest*, **35**, 622-625 (2004).
 26. "Polymer-stabilized liquid crystal light modulators," S.H. Kim and L.C. Chien, Electronic Imaging 2004, San Jose, CA, Jan. 19-21, 2004.
 27. "Polymer-enhanced bend nematic displays," S.H. Kim and L.C. Chien, Electronic Imaging 2003, Santa Clara, CA, Jan. 21-22, 2003.
 28. "Polymer Enhanced Bend Nematic Cells," American Chemical Society, Fall Meeting, Aug 21-24, 2002, Boston, MA.
 29. "Light Scattering Study of Director Fluctuations in a Polymer-stabilized Fingerprint State of a cholesteric Liquid Crystal," K. Kang, S. Sprunt, L.C. Chien, pp.1159, American Physics Society, March Meeting, March 20-22, (2002).
 30. "IR imaging of liquid crystal optical pattern forming states," S.W. Kang, D.W. Rafferty, J. Koneig, L.C. Chien, 19th International Liquid Crystal Conference, July 1-5, 2002, Edinburgh, Scotland.
 31. "New banana-shaped liquid crystals with a chiral terminal group," C.K. Lee and L.C. Chien, *IMID'02*, August, 2002, Daegu, Korea.
 32. "Bent-core liquid crystal polymers," E.J. Choi and L.C. Chien, 19th International Liquid Crystal Conference July, 2002.
 33. "New banana-shaped liquid crystals with a vinyl terminal group," C.K. Lee and L. C. Chien, 19th International Liquid Crystal Conference July, 2002.
 34. "High birefringence liquid crystals and mixtures," O. Catanescu and L. C. Chien, 19th International Liquid Crystal Conference July, 2002.
 35. "Effect of polymer networks on ferroelectric liquid crystals," S.N. Lee and L. C. Chien, 19th International Liquid Crystal Conference, July, 2002.
 36. "A Novel Polymer Patterning Method based on Patterning Forming States of Liquid Crystals as Templates," S. W. Kang, S. Sprunt, L.-C. Chien, *Mat. Res. Soc. Symp. Proc.* **709**, cc6.3, (2002).
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 38. "Photopolymerization on Freely-Suspended Smectic Films," P. Chu, L.C. Chien, Pacific Polymer Conference 2001, Kona, Hawaii, December 9-13, 2000.
 39. "Polymer Stabilized Ferroelectric Liquid Crystals," S. Suresh, S. Kim, L.C. Chien, 8th FLC Conference, Washington DC, August, 5-10, 2001.
 40. "Morphology-Dependent Switching of Polymer-Stabilized Cholesteric Gratings," L.C. Chien, S.N. Lee, Sprunt, Fall 2000 ACS 220th National Meeting, Washington, DC, August 20-24, 2000
 41. "Ferroelectric Smectic Mesophase Formed by Banana-Shaped Achiral Liquid Crystal," L.C. Chien, J.H. Kim, C. Lee, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 42. "Field-Induced Director Tilt Angle Change in Smectic Phases of Banana-Shaped Materials," G. Nair, A. Jakli, C. Lee and L. C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 43. "Self-assembly of Disk-Shaped Molecules to Form Lyo-Mesophases with Tunable

- Chirality,” M. Sonpatki, L.C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
44. “Advanced Liquid Crystal Alignment Materials: Low-Molecular-Weight Photo-Crosslinkable Composites,” O. Yaroshchuk, L.Cada, M. Sonpatki, L.C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 45. “Ferroelectric Lyo-mesophase of Banana-shaped Molecules Showing Electro-Optical Switching at Room Temperature,” A. Lakli, Y. Huang, C. Wenyi, S. Wang, C. Lee and L.C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 46. “Chirality Induced by Polymer Network on Non-Chiral Banana-Shaped Molecules,” A. Jakli, G. Nair, C. Lee, L.C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 47. “Cholesteric Liquid Crystal Directed and Polymerstabilized Square-Lattice Pattern and Its Diffraction Properties,” S.W. Kang, S. Sprunt, L.C. Chien, 18th International Liquid Crystal Conference, Sendai, Japan, July 24-28, 2000.
 48. “Light Induced 3D Structures in the Liquid Crystalline Side-Chain Polymers with Azobenzene Functional Groups,” O. Yaroshchuk, T. Sergan, J. Lindu, S.N. Lee, J. Kelly, and L.C. Chien, Optics of Liquid Crystal, Puerto Rico, September 28-October 1, 1999.
 49. “Polarizing Microscopy of a Chiral Discotic,” T. Sergan, M. Sonpatki, J. Kelly, L.C. Chien, Optics of Liquid Crystal, Puerto Rico, September 28-October 1, 1999
 50. “Optical Characterization of Discotic Liquid Crystalline Films,” T. Sergan, M. Sonpatki, J. Kelly, L.C. Chien, Optics of Liquid Crystal, Puerto Rico, September 28-October 1, 1999.
 51. “High Temperature antiferroelectric smectic phase composed of banana-shaped achiral molecules,” S. Wrobel, W. Haase, D. Kilian, L.C. Chien, C.K. Lee, 7th FLC Conference, Darmstadt, Germany, August 29-Sept 3, 1999.
 52. “Formation of double-twisted helix in isoregic chiral smectic polyesters,” L.C. Chien, F. Bai, Y.Li, S.Z.D. Cheng, R. Petschek, 7th FLC Conference, Darmstadt, Germany, August 29-Sept 3, 1999.
 53. “Cyanohydrin-containing side-chain ferroelectric liquid crystalline copolymers,” L.C. Chien, A.J. Walz, I.G. Shenouda, 7th FLC Conference, Darmstadt, Germany, August 29-Sept 3, 1999.
 54. “Spontaneous Formation of Double-twisted helix in a banana-shaped liquid crystal,” C.K. Lee and L.C. Chien, 7th FLC Conference, Darmstadt, Germany, August 29-Sept 3, 1999.
 55. “Fluorescent Properties of Linear and Branched Polyphenylquinoxalines” J.B. Baek and L.C. Chien, Aug22-26, 1999, 218th ACS, New Orleans, LA.
 56. “Design and synthesis of Novel Conjugated Chiral Materials for Nonlinear Optics” S. Wang, and L.C. Chien, Aug22-26, 1999, 218th ACS, New Orleans, LA.
 57. “Anisotropic Photopolymerization and Fluorescence Study of Discotic Materials,” Symposium of “Polymers in Display Applications,” M. Sonpatki and L.C. Chien, Aug22-26, 1999, 218th ACS, New Orleans, Louisiana.
 58. “Spontaneous Formation of Double-Twisted Helix in a Banana-Shaped Liquid and Isoregic Chiral Smectic C Polyesters,” Symposium of “Hydrogen Bonding for Macromolecular Self-Assembly,” C.K. Lee and L.C. Chien, Aug22-26, 1999, 218th ACS, New Orleans, Louisiana.
 59. “HPDLC color reflective displays,” H. Yuan, J. Colegrove, G. Hu, T. Fiske, A. Lewis, J. Gunther, L. Silverstein, C. Bowley, G. Crawford, L.C. Chien and J. Kelly, *SPIE* symposium, Orlando FL, April 7, 1999.
 60. “Light Absorption Properties of Anthraquinone and Guest Host Liquid Crystal Displays.” Shungxi Wang, Sugat Abeygunaratanath, L.-C. Chien, Materials Research

- Society Spring 1999, "Liquid Crystal Materials and Devices Symposium," San Francisco, CA.
61. "Morphology and Electro-optic Properties of Polymer Stabilized Diffractive Gratings from Cholesteric Liquid Crystals," S.N. Lee, S. Sprunt and L.C. Chien, 17th International Liquid Crystal Conference, 1998, Strasbourg, France.
 62. "White Reflective Polymer Stabilized Cholesteric Displays with Chiral Polymer Network Formed in Cholesteric Liquid Crystals," T.H. Tong, L.A. Borkowski, T.M. Kim and L.C. Chien, 17th International Liquid Crystal Conference, 1998, Strasbourg, France.
 63. "Bistable Polymer Stabilized Reflective Liquid Crystal Displays," L.-C. Chien, J. Cho, N. Leroux, 17th International Liquid Crystal Conference, 1998, Strasbourg, France.
 64. "Photochemical Modification of a Cholesteric Side-Chain Copolysiloxane," S. Campbell, Y. Lin, U. Muller, and L.-C. Chien, ACS 1998 Spring Annual Meeting, Dallas, Texas.
 65. "Polymer Stabilized Diffraction Gratings from Cholesteric Liquids," S. Lee, L.-C. Chien and S. Sprunt, 1998 Society of Information Display Annual Conference, Anaheim, CA.
 66. "White Reflective Displays from Polymer Stabilized Cholesteric Liquid Crystals," L.-C. Chien, J. Cho, N. Leroux, 1998 Society of Information Display Annual Conference, Anaheim, CA.
 67. "New Bilaterally Linked Mesogens in Main-Chain Polymers with Exhibition of Biaxial Fluctuation in Nematic Phase," T.-T. Tong, A. Primak, S. Kumar and L.-C. Chien, ACS 1998 Spring Annual Meeting, Dallas, Texas.
 68. "Aggregation Model for Phase Separated Polymer Networks," S. Hudson, W. Sophanowong, J.F. Boyle, L.C. Chien, American Physical Society 1998 March Meeting, Los Angeles, CA.
 69. "Concentration Dependence of Photoluminescence and Electroluminescence in BHDT," S. Blumstengel, I. Sokolik, D. Voloschenko, M. He and L.-C. Chien, *Materials Research Society Meetings Fall '97*, December 1-5, 1997, Boston, MA.
 70. "Effects of Low-Polymer Content in a Liquid Crystal Display," L.-C. Chien, 5th *Chemical Congress of North America*, November 11-15, 1997, Cancun, Mexico.
 71. 72. "New Main-Chain Side-On Liquid-Crystalline Polyesters," T. Tong and L.C. Chien, 1997 Gordon Conference on Liquid Crystals, June, 1997, Tilton, New Hampshire.
 73. "New Polyimide Alignment Films for LCDs," L.-C. Chien, C.M. Hudson, D. Davis, B. Taheri, R. Klouda, Y.-M. Zhu, 1997 *Society of Information Display International Symposium*, May 1997, Boston, MA.
 74. "Photochemical Modification of Cholesteric Side-Chain Copolysiloxane," Sandi Campbell and L.-C. Chien, 1997 Waldo Semon Undergraduate Research Award in Polymer Science and Polymer Engineering, April 18, 1997, The University of Akron, Akron, OH.
 75. "Chiral Resolution of 10,10'-dihydroxy-9,9'-biphenanthryl and Its application in the Color Patterning of Reflective Cholesteric Displays," Y. Lin and L.-C. Chien, *Symposium of Photochemistry, Optics, Sensors, and Switches*, 213 ACS Meeting, April 13-17, 1997, San Francisco, CA.
 76. "Electroluminescent Materials Based on bis-alkoxy phenylene thiophenes," M.He, D. Voloschenko and L.C. Chien, *Third International Conference on Organic Nonlinear Optics*, Marco Island, FL, Dec. 16-20, 1996.
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 78. "Photoasymmetric Synthesis of Helicenes in Liquid Crystals," Y. Lin and L.C. Chien, 16th *International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 79. "High-Birefringence Mesomorphic Side-On Systems for Polymer Stabilized Broadband

- Reflective Displays, N. Leroux, J. Cho and L.C. Chien, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
80. "Correlation of Electrooptical and Raman Characteristics, of Polymer-Stabilized Cholesteric Texture Films, A.Y.G. Fuh, J.W. Doane, D.K. Yang and L.C. Chien, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 81. "Miscibility Phase Diagrams of the Mixtures of Side-on Side-chain Liquid Crystalline Polymer and Low Molar Mass Liquid Crystals, M.C. Chang, H.W. Chiu, T.Kyu, N. Leroux and L.C. Chien, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 82. "Photopolymerization in Ordered Systems," L.C. Chien, M.N. Boyden and I.G. Shenouda, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 83. "Color Pixelation of Reflective Cholesteric Displays," L.C. Chien, U. Muller, F. Vicentini, and Y. Lin, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 84. "Optical Studies of Anisotropic Networks in Polymer Stabilized Liquid Crystals, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
 85. "Synthesis and Properties of Regiocontrolled Chiral Liquid-Crystalline Polyesters," F. Bai, L.C. Chien, R. Petschek, J. Ge and S.Z.D. Cheng, *16th International Liquid Crystal Conference*, Kent, Ohio, June 24-28.
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 88. "Synthesis and Mesogenic Properties of New Side-on Systems," N. Leroux and L.C. Chien, 27th ACS CRM and 26th Akron Polymer Conference, Akron, OH, June 1995.
 89. "Design and Regioselective Synthesis of Chiral Liquid-Crystalline Polyesters," F. Bai, L.-C. Chien and R.G. Petschek, *209th ACS National Meetings, Anaheim, CA*, 1995.
 90. "White Reflective Polymer Stabilized Cholesteric Displays," N. Leroux and L.-C. Chien, *209th ACS National Meetings, Anaheim, CA*, 1995.
 91. "Multicolor Reflective Cholesteric Displays and Switchable Color Filters," L.-C. Chien, IUPAC International Symposium on "Functional and High Performance Polymers," November 14-16, 1994, Taipei, Taiwan.
 92. "Optically Active binders Stabilized Cholesteric Reflectors," N. Leroux, L.-C. Chien, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
 93. "Dynamic Light Scattering Study of Polymer Stabilized Liquid Crystal Monodomain," D.F. Gu, A.M. Jamieson, L.-C. Chien, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
 94. "Phase Equilibria in a Mixture of Side-Chain Liquid Crystalline Polymer and Liquid Crystal," H.W. Chiu, C.S. Shen, Z.L. Zhou, T. Kyu, L.G. Cada, L.-C. Chien, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
 95. "A Ferroelectric Polymeric Liquid Crystal," Z.Z. Zhong, D.E. Schuele, W.L. Gordon, L.-C. Chien and A.J. Walz, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
 96. "Polymer Network Formed in Liquid Crystals," Y.K. Fung, D.-K. Yang, S. Ying, L.-C. Chien, S. Zumer, J.W. Doane, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
 97. "Pixelized Cholesteric Display Materials and Methods," L.-C. Chien, U. Muller, M.-F. Nabor, J.W. Doane, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.

98. "Pixelized Cholesteric Display Materials and Methods," L.-C. Chien, ALCOM Symposium on *Stabilized and Modified Liquid Crystals 94*, October 26-27, 1994, Kent, Ohio.
99. "Polymerization in Liquid Crystal Environments and Aligning Effect of Polymer Network," D.K. Yang, Y. Sun, Y. Fung, L.-C. Chien and J.W. Doane, IUPAC International Conference on Liquid Crystal Polymers, September 1994, Beijing, China.
100. "Tailor Made Ferroelectric Liquid-Crystalline Polymers Containing Cyanohydrin Chiral Mesogens," L.C. Chien, I.G. Shenouda and A.J. Walz, IUPAC International Conference on Liquid Crystal Polymers, September 1994, Beijing, China.
101. "Photocrosslinkable and Optically Active Side-Chain Liquid-Crystalline Copolymers," L.G. Cada and L.C. Chien, IUPAC International Conference on Liquid Crystal Polymers, September 1994, Beijing, China.
102. "Ferroelectricity in a Side-Chain Liquid Crystalline Polymer," Z.Z. Zhong, D.E. Schuele, W.L. Gordon, L.C. Chien and A.J. Walz, Gordon Conference on Dielectric Phenomena, July 1994, Plymouth, NH.
103. "Phase Equilibria in a Mixture of Side-Chain Liquid Crystalline Polymer and Liquid Crystal," H.W. Chiu, C.S. Shen, Z.L. Zhou, T. Kyu, L.G. Cada and L.C. Chien, Macroakron'94 IUPAC International Symposium on Macromolecules, July 1994, Akron, Ohio.
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105. "Morphology of a Polymer Gel in Liquid Crystalline Solvent," C. Rajaram, S. D. Hudson and L.C. Chien, Macroakron'94 IUPAC International Symposium on Macromolecules, July 1994, Akron, Ohio.
106. "New Ferroelectric Side-Chain Terpolymers," L.C. Chien, A.J. Walz and I.G. Shenouda, 15th International Liquid Crystal Conference, July, 1994, Budapest, Hungary.
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110. "Synthesis and Characterization of Low Molecular Weight Chiral Liquid Crystals," Shelly K. Landis, L.C. Chien and M.N. Boyden, ACS Cleveland Section, March, 1994, Cleveland, Ohio.
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115. "Oriented Polymer Networks Obtained by Photopolymerization of Diacrylate Molecules

- Dissolved in Nematic Liquid Crystal Solvent," Scharkowski, G.P. Crawford, S. Zumer, L.C. Chien and J.W. Doane, APS meeting of Ohio Section, May 1993.
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"New Ferroelectric Liquid Crystalline Polysiloxanes Containing Cyanohydrin Chiral Mesogens," L.C. Chien and I.G. Shenouda, Polymer Chemistry Division, *Polymer Preprints*, **34**(1), 741, Denver, ACS Meeting, April, 1993.
 121. "New Ferroelectric Liquid-Crystalline Polysiloxanes Containing Cyanohydrin Chiral Mesogens," L.-C. Chien and I.G. Shenouda, Symposium on "Creation of Macroscopic Order in Polymeric Systems" at ACS National Meetings in Denver, March 28, 1993.
 122. "Current Development of Polymer/Liquid-Crystal Dispersions," L.-C. Chien, SPIE Conference Polymer-Dispersed Liquid Crystals, Hsinch, Taiwan, ROC, December 18, 1992.
 123. "Developments in Wide Viewing Angle PDLCS," D.S. Fredley, J.L. West, L.G. Cada and L.-C. Chien, 14th International Liquid Crystal Conference, Pisa, Italy, June, 1992.
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 125. "Liquid Crystalline Behavior of 4-(α -Aminoalkoxy)-4'-cyanobiphenyls and Their Side Chain Epoxy Polymers," L.-C. Chien, L.G. Cada and L. Xie, 14th International Liquid Crystal Conference, Pisa, Italy, June, 1992.
 126. "Liquid Crystalline Polysiloxanes as Potential Electro-Optical and NLO Materials," L.-C. Chien and I.G. Shenouda, ALCOM Symposium on Nonlinear Optics of Liquid Crystals, Polymers and Ordered Fluids, May 27, 1992.
 127. "Anisotropic Binders for Polymer/Liquid Crystal dispersions and Devices," L.C. Chien and L.G. Cada, 1992 International Symposium of the Society for Information Display on "Polymer-Dispersed Liquid Crystal (PDLC) materials and Devices, Boston, Massachusetts, May 20, 1992.
 128. "Synthesis and NLO Properties of Diacetylenic Liquid Crystalline Monomers and Polymers," L.-C. Chien, I.G. Shenouda and L.Li, SPIE on Nonlinear and Electro-Optic Materials for Optical Switching, Orlando, Florida April 20, 1992.
 129. "Synthesis and Properties of Diacetylenic Liquid Crystalline Monomers and Polymers," I.G. Shenouda and L.C. Chien, Polymer Chemistry Division, San Francisco, CA, ACS Meeting, April 5-10, 1992.
 130. "Side-Chain Liquid Crystalline Epoxy Polymers," L.G. Cada, L. Xie and L.C. Chien, Symposium on "Functionalized polymers and Reactive Oligomers," San Francisco, CA, ACS Meeting, April, 1992.
 131. "Reactive Solute/Liquid Crystal Systems in Device Applications," L.C. Chien, I.G. Shenouda, L.G. Cada, D.-K. Yang and J.W. Doane, Optical Engineering Midwest 1992,

- Chicago March 1992.
132. "Liquid Crystal Epoxies for PDLC Applications," L.-C. Chien, ALCOM Symposium on Dispersions of Liquid Crystals and Polymers, June 1991.
 133. Cholesteric Liquid Crystal/Polymer Gel Dispersion Normal- and Reversed-Mode Haze-Free Light Shutters," D. Yang, J. Doane and L.-C. Chien, "ALCOM Symposium on Dispersions of Liquid Crystals and Polymers, June 1991.
 134. "Cholesteric Liquid Crystal/Polymer Gel Dispersion Bistable at Zero Field," D. Yang, J. Doane and L.-C. Chien, ALCOM Symposium on Dispersions of Liquid Crystals and Polymers, June 1991.
 135. "Synthesis and Properties of Diacetylenic Liquid Crystalline Monomers," I.G. Shenouda, P. Pike and L.-C. Chien, ALCOM Symposium on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects, November 1991.
 136. "Reactive Liquid Crystal Monomers," L.-C. Chien, ALCOM Symposium on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects, November, 1991.
 137. "Synthesis and Properties of Diacetylenic Liquid Crystalline Monomers," I.G. Shenouda, P. Pike and L.-C. Chien, ALCOM Symposium on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects, November, 1991.
 138. "Synthesis and Properties of Amine-Containing Liquid Crystals," L.G. Cada, L. Xie and L.-C. Chien, ALCOM Symposium on Novel Liquid Crystal Materials and Optical/Electro-Optical Effects, November, 1991.

AWARDED CONTRACTS

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| 1. | "Development of Color Cholesteric Liquid Crystal Displays and Their Electro-Optics" | Samsung Electronic Corporation, \$130,000/Yr, 1/1/2008-12/31/2010 |
| 2. | "Conductive Liquid Crystalline Elastomers for Aircraft Wing Structures," | AFOSR/STTR, Phase II \$225,000, 5/14/05-5/13/07. |
| 3. | "High Birefringence Liquid Crystal Materials for Infrared Spatial Light Modulators" | AFOSR/STTR, Phase I, \$40,000, 9/1/05-5/1/06. |
| 4. | "High Dielectric Elastomer Actuators" | AFOSR/STTR, Phase I \$76,000, 5/14/04-5/13/05. |
| 5. | "Polymer-Stabilized Optical Controlled Birefringence Displays for LCD-TVs," | Samsung Electronic Corporation, Phase I, \$20,000, 2/1/04-4/30/2004. |
| 6. | "Samsung Research Scholarship," | Samsung Electronic Corporation, Co-PI with 4 colleagues, \$200,000, 2004-2008 |
| 7. | "Foveat, Wide Field-of-View Imaging Sensors for Missile Warning and Tracking Systems," | DARPA (UCF sub. contr.), Phase I, \$150,000, 2/1/04-1/31/07. |
| 8. | "Nanostructured Liquid Crystal and Polymeric Materials and Applications," | ACS Petroleum Research Fund SE type, \$3,600, 8/1/03-12/31/03. |
| 9. | "Optical Beam Steering," DARPA/BNL, | Faculty associate, \$40,000, 8/1/03-12/31/03. |
| 10. | "Steered Agile Beam Devices," | DARPA/Ratheon (subcontract), \$70,000, 7/1/02-6/30/03. |
| 11. | "Fast Switching Liquid Crystal Displays for Field-Sequential Color Reflective Displays," | Samsung SDI, Co-PI (PI: Jack Kelly), \$55,000, 9/1/01-1/31/02. |
| 12. | "Polymer-Stabilized Ferroelectric Liquid Crystal Devices for Optical Beam Steering," | AFOSR (BNL subcontract), \$156,369, 3/1/01-2/28/03. |
| 13. | "Carbon Nanotubes-Reinforced Liquid Crystal Structural Composites," | W/PAFRL-Univ. Dayton (subcontract), \$100,000, 7/01/01-6/30/03. |
| 14. | "Electro-Optic Devices from Banana-shaped | Ohio Board of Reagent, Co-PI, (PI, |

- Liquid Crystals,”
15. “Liquid Crystals and Devices for Agiled Beam Steering,”
 16. “Development of Liquid Crystal Materials for Directed Energy Control,”
 17. “Photo-Induced Anisotropy and Liquid Crystal Alignment Properties of Low Molecular Weight Crosslinkable Materials,”
 18. “Electrically Switchable Polymer-Stabilized Diffraction Gratings from Cholesteric Liquid Crystals,”
 19. “Transparent Conductive Coatings,”
 20. “Alignment and Defects of Lyotropic Liquid Crystals,”
 21. “Viewing-Angle Improving Films for LCDs,”
 22. “Photo-curable Liquid-Crystalline Monomers,”
 23. “Optical Study of Structure and Dynamics in Advanced Polymer-Stabilized Liquid Crystals,”
 24. “Polymer-Dispersed Liquid Crystals for Holographic Data Storage,”
 25. “Molecular Modeling Facilities in Separation and Surface Science, Liquid Crystals, and Biomolecular Recognition,”
 26. “Reactive Chiral Liquid Crystals for Thin Optical Films,”
 27. "Thin Film Polarizers,"
 28. "Reflective Polymer Stabilized Liquid Crystal Displays,"
 29. "High Resolution PSCT Reflective Display on Large Thin Plastic Substrate,"
 30. “Polymer-Dispersed Liquid Crystals for High Definition Display Technology,”
 31. Advanced Liquid Crystalline Optical Materials (ALCOM)
 32. "The Science and Application of Polymer Liquid Crystals and Related Materials,"
 33. "Polymer Liquid Crystals,"
- A. Jakli), \$70,000, 1/1/01-6/30/02.
DARPA/Hughes, \$105,000, 10/1/00-9/30/03.
AFOSR, \$33,000, 3/00-12/00.
- National Science Foundation,
International Travel Supplement:
\$14,600, 1999-2001.
Office of Naval Research, Co-PI (PI:S. Sprunt), \$260,000, 1999-2002.
- Garland Floor Company, Cleveland, Ohio, \$13,000, 1999.
3M Center, St. Paul, MN, J. R. Kelly and O.D. Lavrentovich, L.C. Chien, Co-PI, \$89,000, 1998-1999.
Ohio Research Challenge Fund, Jack Kelly, Co-PI, \$64,000, 1998-1999.
Optical Imaging Systems, Inc., Northville, Michigan, July 1997-December 1997, \$32,975.
Office of Naval Research, Samuel Sprunt and L.-C. Chien, Co-PI, \$50,000, 12/1996-11/1997
Ministry of Education, Taiwan, Republic of China, L.-C. Chien, \$14,000, 8/1/96-7/31/98.
Ohio Board of Regents, Co-PI with 10 other Co-PI's, \$ 50,000, 6/96-5/98.
- Rockwell International, Science Center, Thousand Oaks, California, \$ 119,700, 7/96-6/97
J. Kelly and L.C. Chien, Co-PI, Hewlett-Packard, \$30,374, 1993-1994,
ARPA, J.W. Doane (P.D.), D.K. Yang, L.C. Chien, P. Bos, and J. West, \$1,928,794, 7/94-6/97.
ARPA, J.W. Doane (P.D.), Z. Yaniv, L.-C. Chien and D.-K. Yang, \$725, 838, 10/93-9/95
DARPA, DARPA; J.W. Doane (P.D.), J.R. Kelly, J.L. West and L.-C. Chien, \$1,347,000, 9/91-8/94.
NSF Sci. & Tech. Center, Co-PI, \$~18M, 1991-2001
DARPA URI/ONR, J.W. Doane (P.D.), J.L. West and L.-C. Chien (Fac. Assoc.) \$350,000, 10/89-6/92.
Ohio Board of Regents, \$100,000, 1989-1991.

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| 34. "Optical Power Limiting Liquid Crystal Composites," | U.S. Army Center for Night Vision and Electro-Optics, M. Lee (P.D.), P. Palfy-Muhoray, J.W. Doane, J.L. West and L.-C. Chien, 8/88-7/92, \$1,050,000. |
| 35. <u>Other Research Contracts</u> | Development of liquid crystal materials and displays |
| 1. Thermodisc, Inc., Mansfield, OH, \$900, 2/1998. | |
| 2. Crystalloid LC Display, Hudson, OH, \$14,600, 3/1998. | |
| 3. LXD, Inc., Cleveland, OH, \$1,760, 4/1998 | |
| 4. IBM Watson Center, Yorktown, NY, \$6,188, 4-11/1998. | |
| 5. Wintek LCD Corporation, Taiwan, \$250,000 1997-2002. | |

Students Supervised

A. Undergraduate Students Supervised or Honor Thesis Directed

1. Shelly Landis, won the ACS Cleveland Section 1994 Lubrizol Undergraduate Research Award on her summer '93 work "Synthesis of LCPs" at LCI. (Northwestern U.)
2. Andrew Walz (KSU), **Honors Thesis**, May '94: "Tailor Made Ferroelectric Liquid Crystal Polymers." (U. Virginia)
3. Sam Rubens (KSU), July 93-95, "Synthesis of LCPs."
4. Julie Cho, Spring 94-96, "Synthesis of LCPs."
5. Keith Obermeier (KSU), Sep. 91-Aug. 92, "Synthesis of gel monomers."
6. John Bender (Baldwin-Wallace C., OH), June 92-August 92, "Synthesis of Monomers for PSCT displays." (Brown U.)
7. Paul Pike (KSU), Sept. 92-Sept. 94, "Synthesis of LCs."
8. Karen K. Winely (KSU), Sept. 92-Sept. 94, "Synthesis of LCs."
9. Tom Perkowski (KSU), Jan. 93-Jan 94, "Synthesis of LCPs."
10. Mark Keener, (KSU), Sept 94-May 95, "Synthesis of LCPs."
11. Sandi Campbell, (KSU), **Honors Thesis**, December 96, "Synthesis and Characterization of Cholesteric Polymer Liquid Crystals."
12. Neal D'Sidoky, (KSU), Jan. 94-May 96, "Synthesis of Liquid-Crystalline Polymers and Elastomers."
13. Stella Souers, (KSU), August. 95-Aug. 97. (Crystalloid Inc.)
14. Mike Waxter, (KSU), Jan. 96-June 97, (B.F. Goodrich)
15. Lauren Borkowski, (KSU), Fall 96-98, **Honors Thesis** "High Birefringence LC Monomers for Broad Band Cholesteric Displays."
16. Kate Allender, (Wooster College), Summers 97,98, "Chiral Lyotropic LCs."

17. Bart Heldreth, (KSU), Summer 97, "Polymer-Stabilized Liquid Crystals."
18. Brian Blake, (Miami U., OH) Summer 98, "Emulsion Polymerization of LCPs."
19. Brian Macauley, (KSU) 97-99, **Honor** Thesis, "Synthesis of reactive liquid crystalline monomers and Mesomorphic properties." (Nanomaterials, OH)
20. Amy Raber (KSU, MS/Chemistry) 1999-2000.
21. Julie Stile, (KSU) 2003-2004.

B. Graduate Students Directed

1. Leonorina. G. Cada, Ph.D. 1993; "Synthesis and Properties of Epoxy- and Siloxane-Based Side-Chain Liquid Crystalline Polymers." (Assistant Professor, U. Phillippines)
2. Bai Feng, M.S, 1996 Synthesis and Properties of Regiocontrolled Liquid-Crystalline Polyesters with Main-Chain Chirality."
3. Jennifer Colegrove, M.S. 1997, polymer-dispersed liquid crystals.
4. Jaehyuck Choi, M.S, 1999, Polymer-dispersed liquid crystals.
5. Keshav S. Gavitam, M.S. 1999, Organic Light Emitting Polymers.
6. Larry Manuel, Ph.D., 2002, Synthesis and characterization of ferroelectric liquid crystals.
7. Shinwoong Kang, Ph.D, 2003, Polymer-stabilized cholesteric liquid crystals for electrically-switchable diffraction gratings". **2001 Materials Research Society Silver Medal Award Winner.**
8. Sang Hwa Kim, Ph.D. 2004, Morphology and electro-optics of polymer-modified liquid crystal devices
9. Dong Wang, 2003-present, Switchable liquid crystal optical elements.
10. Clington Braganza, 2005-present, High Dielectric Liquid Crystal Composites.
11. Shin-Ying Lu, 2006-present, Electro-Optical and Photonics Applications of Polymer-Stabilized Liquid Crystal Devices.
12. Lu Lu, 2007-current, Polymer Stabilized/Dispersed Liquid Crystal and Nanoparticle Composites.

C. Postdoctoral Fellows Directed

1. Cui-Lien. Lin (90-91)
2. Ibrahim G. Shenouda (91-93)
3. V. Surendrath (92)
4. Nathalie Leroux (93- 95)
5. Uwe Müller (93-94)
6. Marie-Flore Nabor (93-94)
7. Frédéric Vicentini (94-95)
8. Mingqian He (95-96)
9. Chris Hudson (95-96)
10. Yuhui. Lin (94-97)
11. Tony Ta-Hong Tong (96-98)
12. Soonnam Lee (97-99)
13. Milind Sonpatki (97-99)
14. Shungxi Wang (98-00)

15. Jong-Beom Baek (98-99)
16. Peihwei Chu (00-01)
17. S. Suresh (00-01)
18. Toru Doi (01-02)
19. Soon Nam Lee (01-03),
20. Otilia Catanescu (01-05)
21. Kin Nam Chang (05-06)
22. Andrii Golovin (05-07)
23. Jong Chan Won (06-07)
24. Jeong-Yeon Hwang (06-08)

D. Technicians Directed

1. Carla M. Citano, Feb. 91-Dec. 91, (Miles Inc., Indiana)
2. William C. Jones, June 92-Dec. 92, (Lomac Inc., Michigan)
3. Mary N. Boyden, March 93-Aug. 95, (Ph.D., Chemistry, U. of Pittsburg).
4. Julie Cho, 96-99. (Chemist, LCI/KSU)
5. Neal D'Sidoky, 95-97. (Quantum Materials, San Diego, CA)
6. Sandi Campbell, 95-97, (Research Scientist, NASA Lewis Center)

E. Visiting Professor

1. Professor Andy Y.-G. Fuh, Department of Physics, National Cheng-Kung University, Tainan, Taiwan, ROC, July-August, 1997.
2. Dr. Chun-Ming Huang, Wintek Corporation, Taichung, Taiwan, ROC, February, 1999.
3. Chong Kwan Lee, Department of Chemistry, Geosun National University, Chinju, Korea, 1997-1999.
4. Professor Ru-Ping Pan, Department of Electro Physics, National Chiao Tung University, Hsin-Chu, Taiwan, ROC, August 2001.
5. Dr. Toru Doi, Tosoh Corporation, Yokaichi, Japan, 2001-2002.
6. Professor Lachzar Komitov, University of Gotherberg, Gotherberg, Sweden, May, 2002.
7. E-Jong Choi, Department of Polymer Science and Engineering, National Kumoh University, Kumi, Korea, summer 2004.
8. Professor, Dr. Dirk Broer, Philips Research Laboratory, Eindhoven, Netherland, June 2005.
9. Kinam Chun, SK Corporation Dajeon, Korea, 2005-2006.
10. Ming Hyoon Lee, Department of Polymer Science and Engineering, National Chongbuk University, Cheongju Chongbuk, Korea (04-06)