

Guanjun Tan | Ph. D. candidate

4304 Scorpius St., Orlando, FL 32816, USA | (407) 800-2128 | guanjun_tan@knights.ucf.edu
| <http://www.guanjuntan.com>

Research Interest

Liquid crystal display, organic LED, quantum-dot, virtual reality and augmented reality

Education

- Ph. D. in progress** — Optics (Advisor: Prof. Shin-Tson Wu, GPA: 3.98/4.0) 08/2014 — Present
CREOL, College of Optics and Photonics, University of Central Florida,
Orlando, FL
- B.S.** — Optical Information Science and Technology (GPA: 3.93/4.30) 08/2010 — 06/2014
Department of physics, University of Science and Technology of China (USTC),
Hefei, Anhui, China

Research Experience

- Research assistant** — University of Central Florida 01/2018 — Present
Project coordinator of collaborative project with Goertek:
○ System development for virtual reality displays
- Research assistant** — University of Central Florida 01/2018 — Present
Project leader of collaborative project with AU Vista:
○ Simulation modeling of HDR LCD with mini-LED local dimming backlight
○ Image quality analysis of micro-LED displays
- Research assistant** — University of Central Florida 01/2017 — 01/2018
Project leader of collaborative project with ITRI (Taiwan):
○ Optical component development for virtual reality and augmented reality
○ Built a simulation software for OLED/QLED with external microstructures
○ Built a simulation software for OLED/QLED with internal nanostructures
○ Mixed-level 3-D optical modeling for OLED and QLED light extraction
○ Developed a systematic optimization algorithm for RGB OLED display to optimize optical efficiency, color gamut and angular color shift
- Research assistant** — University of Central Florida 09/2015 — 12/2017
Project leader of collaborative project with AU Vista:
○ Sub-millisecond response liquid crystal mode, including uniform lying helix (ULH) and uniform standing helix (USH) modes

- Developed electro-optical models for ULH and USH modes
- Quantitatively analyzed viewing angle performance of ULH and USH modes
- Proposed compensation methods to widen viewing angle of ULH and USH
- Developed new system configurations for quantum-dot enhanced LC display
- Co-developed fast response nematic liquid crystal modes

Research assistant – University of Central Florida

08/2014 – 12/2016

Project coordinator of collaborative project with ITRI (Taiwan):

- Designed high ambient contrast ratio flexible OLED and QLED display devices without circular polarizer (patent issued)
- Designed low-reflectance, high-efficiency and negligible color shift OLED and QLED devices
- Developed broadband moth-eye anti-reflection film for flexible displays

Professional Skills

Liquid crystal simulation:

- Proficiency in LC electro-optical simulation with Techwiz LCD, DIMOS, COMSOL Multiphysics and MATLAB
- Proficiency in LC display system design with LightTools and MATLAB

Electromagnetic simulation:

- Proficiency in OLED/QLED optical simulation with MATLAB, COMSOL Multiphysics, FDTD solutions and RSoft
- Proficiency in metasurface optical simulation with COMSOL Multiphysics, FDTD solutions and RSoft

Optical design:

- Proficiency in optical thin-film coating design with TFCalc
- Working knowledge of optical system design with Zemax
- Working knowledge and experience in color science

Optical/Display Characterization & Measurement

- LCM characterization
- Electra and optical characterization of Liquid Crystal Materials
- Optical characterization of organic LED devices
- Spin-coating, sputter coating and other basic clean room operations
- Hands-on experience with optical system assembly and setup

Coding and other software:

- Code programming: MATLAB, Python, C, C++
- Working knowledge of LabVIEW and 3ds Max

Honors & Awards

SPIE Optics and Photonics Education Scholarship	05/2018
Dr. Martin Schadt Best Paper Award, SLCP	04/2018
JSID's Outstanding Student Paper of the Year Award	06/2017
Student Travel Grant Award, SID International Symposium	05/2017
Distinguished Student Paper, SID International Symposium	05/2016
Student Travel Grant Award, SID International Symposium	05/2016
Graduate Dean's Fellowship, University of Central Florida	09/2014
CREOL Graduate Research Fellowship, University of Central Florida	09/2014
Outstanding Graduate Award, USTC	07/2014
National Encouragement Scholarship, USTC	10/2013
Outstanding Undergraduate Research Project, USTC	10/2013
First Prize of Undergraduate Mathematical Contest, Anhui, China	10/2012
Outstanding Student Leader, USTC	10/2012
Societe Generale Responsibility Scholarship, USTC	09/2012
National Scholarship (top 1%), USTC	09/2011
Outstanding Freshman Scholarship, USTC	09/2011

Journal Publications

1. Y.H. Lee, **G. Tan**, K. Yin, T. Zhan, and S. T. Wu, "Compact see-through near-eye display with depth adaption," *J. SID* **26**(2), 64-70 (2018).
2. H. Chen, **G. Tan**, and S. T. Wu, "Ambient contrast ratio of LCDs and OLED displays," *Opt. Express* **25**(26), 33643-33656 (2017).
3. **G. Tan**, J. H. Lee, S. C. Lin, R. Zhu, S. H. Choi, and S. T. Wu, "Analysis and optimization on the angular color shift of RGB OLED displays," *Opt. Express* **25**(26), 33629-33642 (2017).
4. **(Featured paper)** G. Liu, Y. H. Lee, Y. Huang, Z. Zhu, **G. Tan**, M. Q. Cai, P.-P. Li, D. Wang, Y. Li, S. Pang, C. Tu, S.T. Wu, and H.-T. Wang, "Dielectric broadband meta-vector-polarizers based on nematic liquid crystal," *APL Photonics* **2**(12), (2017).
5. **(Review paper)** **G. Tan**, Y. H. Lee, F. Gou, H. Chen, Y. Huang, Y.F. Lan, C.Y. Tsai, and S. T. Wu, "Review on Polymer-Stabilized Short-Pitch Cholesteric Liquid Crystal Displays," *J. Phys. D: Appl. Phys.* **50**, 493001 (2017).
6. **(Review paper)** Y. H. Lee, **G. Tan**, T. Zhan, Y. Weng, G. Liu, F. Gou, F. Peng, N.V. Tabiryan, S. Gauza, and S. T. Wu, "Recent Progress in Pancharatnam-Berry Phase Optical Elements and the Applications for Virtual/Augmented Realities," *Optical Data Processing and Storage* **3**, 79-88 (2017).

7. **(OSA news release) G. Tan**, J.-H. Lee, Y.-H. Lan, M.-K. Wei, L.-H. Peng, I-C. Cheng, and S. T. Wu, "Broadband Antireflection Film with Moth-Eye-Like Structure for Flexible Display Application," *Optica* **4**(7), 678-683 (2017).
8. H. Chen, **G. Tan**, M. C. Li, S. L. Lee, and S. T. Wu, "Depolarization effect in liquid crystal displays," *Opt. Express* **25**(10), 11315-11328 (2017).
9. **G. Tan**, Y. H. Lee, F. Gou, M. Hu, Y. F. Lan, C. Y. Tsai, and S. T. Wu, "Macroscopic Model for Analyzing the Electro-Optics of Uniform Lying Helix Cholesteric Liquid Crystals," *J. Appl. Phys.* **121**, 173102 (2017).
10. **(OSA news release) Y. Huang**, H. Chen, **G. Tan**, H. Tobata, S-I Yamamoto, E. Okabe, Y. F. Lan, C. Y. Tsai, and S. T. Wu, "Optimized Blue-Phase Liquid Crystal for Field-Sequential-Color Displays," *Opt. Mater. Express* **7**(2), 641-650 (2017).
11. H. Chen, R. Zhu, **G. Tan**, M. C. Li, S.-L. Lee, and S. T. Wu, "Enlarging the Color Gamut of Liquid Crystal Displays with a Functional Reflective Polarizer," *Opt. Express* **25**(1), 102-111 (2017).
12. H. Chen, **G. Tan**, Y. Huang, Y. Weng, T.-H. Choi, T.-H. Yoon and S. T. Wu, "A Low Voltage Liquid Crystal Phase Grating with Switchable Diffraction Angles," *Sci. Rept.* **7**, 39923 (2017).
13. **G. Tan**, R. Zhu, Y. S. Tsai, K. C. Lee, Z. Luo, Y. Z. Lee, and S. T. Wu, "High Ambient Contrast Ratio OLED and QLED without A Circular Polarizer," *J. Phys. D: Appl. Phys.* **49**, 315101 (2016).
14. **(Outstanding Student Paper of the Year) R. Zhu**, H. Chen, T. Kosa, P. Coutino, **G. Tan**, and S. T. Wu, "High-ambient-contrast Augmented Reality with a Tunable Transmittance Liquid Crystal Film and A Functional Reflective Polarizer," *J. SID* **24**(4), 229-233 (2016).
15. R. Zhu, **G. Tan**, J. Yuan, and S. T. Wu, "Functional Reflective Polarizer for Augmented Reality and Color Vision Deficiency," *Opt. Express* **24**(5), 5431-5441 (2016).
16. D. Xu, F. Peng, **G. Tan**, J. He and S. T. Wu, "A Semi-empirical Equation for the Response Time of In-Plane Switching Liquid Crystal Display and Measurement of Twist Elastic Constant," *J. Appl. Phys.* **117**, 203103 (2015).
17. J. Yuan, **G. Tan**, D. Xu, F. Peng, A. Lorenz and S. T. Wu, "Low-voltage and Fast-response Polymer-Stabilized Hyper-Twisted Nematic Liquid Crystal," *Opt. Mater. Express* **5**, 1339-1347 (2015).
18. D. Xu, **G. Tan** and S. T. Wu, "Large-angle and High-efficiency Tunable Phase Grating Using Fringe Field Switching Liquid Crystal," *Opt. Express* **23**, 12274-12285 (2015).

Patents

1. Y.-S. Tsai, K.-C. Lee, S. T. Wu, **G. Tan**, R. Zhu, "Display Device and Optical Film," US Patent 9,680,132 B1 (June 13, 2017).

Conference Proceedings

1. **G. Tan**, Y.-H. Lan, M.-K. Wei, L.-H. Peng, I.-C. Cheng, S. T. Wu, and J.-H. Lee, "Antireflection and Self-Cleaning Film with Moth-eye-like Structure for Mobile Flexible Displays," Proc. SPIE **10556**, Advances in Display Technologies VIII, 1055608 (2018).
2. **G. Tan**, Y.-H. Lee, F. Gou, M. Hu, Y.-F. Lan, C.-Y. Tsai, and S. T. Wu, "Figure of Merit for Optimizing the Performance of Uniform Lying Helix Cholesteric Liquid Crystals," SID Intl. Symp. Digest **48**, 490-493 (2017).
3. F. Gou, Y.-H. Lee, **G. Tan**, M. Hu, Y.-F. Lan, C.-Y. Tsai, and S. T. Wu, "Submillisecond Grayscale Response Time of a Uniform Lying Helix Liquid Crystal," SID Intl. Symp. Digest **48**, 1822-1825 (2017).
4. Y. Huang, H. Chen, **G. Tan**, H. Tobata, S. Yamamoto, E. Okabe, Y.-F. Lan, C.-Y. Tsai, and S. T. Wu, "New Blue-Phase Liquid Crystal Optimized for Color-Sequential Displays," SID Intl. Symp. Digest **48**, 486-489 (2017).
5. **G. Tan**, J.-H. Lee, Y.-H. Lan, M.-K. Wei, L.-H. Peng, I Cheng, and S. T. Wu, "Moth-eye Anti-reflection Surface for Sunlight Readable Flexible Displays," SID Intl. Symp. Digest **48**, 574-577 (2017).
6. H. Chen, R. Zhu, **G. Tan**, M.-C. Li, S.-L. Lee, and S. T. Wu, "Wide-Color-Gamut LCD with a Functional Reflective Polarizer," SID Intl. Symp. Digest **48**, 1659-1662 (2017).
7. Y.-H. Lee, **G. Tan**, Y. Weng, and S. T. Wu, "Switchable Lens based on Cycloidal Diffractive Waveplate for AR and VR Applications," SID Intl. Symp. Digest **48**, 1061-1064 (2017).
8. **G. Tan**, R. Zhu, Y. S. Tsai, K. C. Lee, Z. Luo, Y. Z. Lee and S. T. Wu, "High Ambient Contrast Ratio OLED and Quantum-dot LED without a Circular Polarizer," SID Intl. Symp. Digest **47**, 1509-1512 (2016).
9. D. Xu, **G. Tan** and S. T. Wu, "Multi-angle Beam Steering for Head-Mounted Displays," SID Intl. Symp. Digest **47**, 1826-1829 (2016).
10. **(Distinguished Student Paper)** R. Zhu, H. Chen, **G. Tan**, T. Kosa, P. Coutino and S. T. Wu, "A High-Ambient-Contrast Augmented Reality System," SID Intl. Symp. Digest **47**, 1025-1028 (2016).

Media Coverage

1. "Learning from Nature: Moth Eyes Inspire Nonreflective Screen Coating," *Scientific American*, 26 July 2017.
2. "Moths Help Scientists Attack Glare," *The Wall Street Journal*, 07 July 2017.
3. "A Better Touch Screen, Inspired by Moth Eyes," *Discover Magazine*, 22 June 2017.
4. "Eyes Inspire Glare-Resistant Coating for Cellphone Screens," *National Public Radio*, 22 June 2017.
5. "New Screen Coating Makes Reading in Sunlight a Lot Easier. The Secret? Moth Eyes," *OSA News Release*, 22 June 2017.
6. "Novel Liquid Crystal Could Triple Sharpness of Today's Televisions," *OSA News Release*, 01 February 2017.

Leadership & Services

Board Member, CREOL Association of Optics Students (CAOS), UCF	09/2016 – 09/2017
Vice president, Society of Information Display Student Branch, UCF	09/2016 – 09/2017
Secretary, IEEE Photonics Society Student Chapter, UCF	09/2015 – 09/2016
Treasurer, Chinese Students and Scholars Association, UCF	04/2015 – 09/2016
Webmaster, Society of Information Display Student Branch, UCF	09/2014 – 09/2015

Journal Reviewer

Optics Express, Optics Letters, Photonics Research, Journal of Physics D: Applied Physics, IEEE Photonics, ACS Applied Nano Materials, AIP Advances, Journal of Luminescence (~30 times review experience)