Shu-Wei Huang

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We study novel ultrafast nonlinear dynamics in photonic structures and incorporate the dynamics to enhance the device performances with focuses on sensing and imaging applications. We are interested in functional integration of photonic devices with microfluidic and 2D materials to broaden the scope of chip-scale sensing and imaging devices. We are part of the NSF Quantum Systems through Entangled Science and Engineering, working on quantum-enhanced photonic sensors.

EDUCATION

Massachusetts Institute of Technology (MIT) **Cambridge, USA**
PhD, Electrical Engineering & Computer Science, Aug 2012
Thesis advisor: Franz X. Kärtner
Thesis title: *High-Energy Sub-Cycle Optical Waveform Synthesizer*

Massachusetts Institute of Technology (MIT) **Cambridge, USA**
MS, Electrical Engineering & Computer Science, Dec 2008
Thesis advisor: James G. Fujimoto
Thesis title: *New Technologies for Optical Coherence Microscopy*

National Taiwan University **Taipei, Taiwan**
BSc, Electrical Engineering, Aug 2005

PROFESSIONAL EXPERIENCE

Assistant Professor of Biomedical Engineering **CU Boulder**
Aug 2019 − present

Assistant Professor of Electrical, Computer, & Energy Engineering **CU Boulder**
Aug 2017 − present

Assistant Researcher (equivalent to Assistant Research Professor) **UCLA**
Aug 2014 − Aug 2017

Postdoctoral Associate **Columbia University**
Dec 2012 − Jul 2014

HONORS

- Senior Member, OSA − The Optical Society
- Senior Member, SPIE − The International Society for Optical Engineering
- Faculty Early Career Development Award, National Science Foundation
- Collaborative Research Travel Award, Burroughs Wellcome Fund
- Young Investigator Award, Air Force Office of Scientific Research
- Jin-Au Kong Outstanding Doctoral Thesis, Massachusetts Institute of Technology

PROFESSIONAL ACTIVITIES

- Board member, *Colorado Photonics Industry Association* (2021−present)
- Early career editorial advisory board, *APL Photonics* (2021−present)
- Organizing committee: CIOP subcommittee on ultrafast and nonlinear phenomena (2020−present)
- Organizing committee: IEEE IPC subcommittee on optical microresonators and devices (2019−present)
- Organizing committee: CLEO subcommittee on nonlinear optical technologies (2016−2019)
- Vice chair: nonlinear optics technical group of The Optical Society (2018−2020)

- Webinar chair: nonlinear optics technical group of The Optical Society (2015−2018)
- Reviewer for National Science Foundation and Air Force Office of Scientific Research.
- Reviewer for international refereed journals including *Optica*, *Phys. Rev. Lett.*, *Science Adv.*, *Nature Commun.*, *Light: Sci. & Appli.*, and *Nature Photon.*.

POST-DOCTORAL, GRADUATE AND UNDERGRADUATE STUDENT ADVISING

Research scientists and post-doctoral research associates (current):

1. Dr. Bowen Li, 01/2019 – present (2021 OSA the Bernard J. Couillaud Prize)
2. Dr. Mingming Nie, 09/2018 – present

Graduate students (current):

1. Jonathan Musgrave, 08/2021 – present
2. Jan Bartos, 08/2018 – present (2021 ED Graduate Assistance in Areas of National Need)
3. Neeraj Prakash, 08/2018 – present
4. Yijun Xie, 08/2018 – present
5. Pranav Bharadwaj, 01/2022 – present (master student)

Undergraduate students (current):

1. Christopher Ivan Gonzalez, 10/2021 – present (STEM Routes Uplift program)
2. Kyle Niemiec, 10/2021 – present (STEM Routes Uplift program)
3. Tianyi Wang, 01/2022 – present
4. Cassidy Bliss, 01/2022 – present

Graduate students (alumni):

1. Eugene Tsao (now at NIST, 2019 National Defense Science and Engineering Graduate Fellowship)
2. Rachel Westerkamp (now at Lockheed Martin, 2019 NSF Graduate Research Fellowship)
3. Jiarong Wong (now at Tianhe school of Guangdong experimental middle school)

Undergraduate students (alumni):

1. Andrea Vargas, 10/2021 – 12/2021 (STEM Routes Uplift program)
2. Jesse Duran, 06/2021 – 08/2021 (NIH Undergraduate Research Training Initiative for Student Enhancement)
3. Jun Yan, 01/2020 – 10/2020 (now a graduate student at Tsinghua University, 2020 Undergraduate Research Opportunities Program)
4. Shida Zhang, 01/2019 – 12/2019 (now a graduate student at Georgia Institute of Technology, 2019 Undergraduate Research Opportunities Program)
5. Maxwell Adolphson, 01/2018 – 07/2019 (now a graduate student at Washington University in St. Louis)
6. Chutao Wei, 06/2018 – 08/2018 (now a graduate student at University of Colorado Boulder, 2018 CU Summer Program for Undergraduate Research)
7. Hyeon-Seo Yun, 06/2018 – 08/2018 (now a graduate student at Purdue University, NSF Research Experiences for Undergraduates)

PATENT LIST

1. A. Kung, T.-L. Wee, and S.-W. Huang, *Controlling pulses in optical microscopy*, US 20080100834 A1.
2. F. X. Kärtner, G. Abram, W. P. Putnam, S.-W. Huang, and E. L. Falcao-Filho, *Apparatus and method for generating high-intensity optical pulses with an enhancement cavity*, US 20110073784 A1.
3. H. Zhou, S.-W. Huang, and C. W. Wong, *Normal dispersion frequency comb*, US 20150030040 A1.
4. C. W. Wong, S.-W. Huang, and Y. Li, *Adiabatic dispersion-managed frequency comb generation*, US 20190296512 A1.
5. C. W. Wong, S.-W. Huang, and A. K. Vinod, *All-microwave stabilization of microresonator-based optical frequency combs*, US 11175563 B2.

6. S.-W. Huang, and P. Li, *LiDAR and laser measurement techniques*, pending.
7. B. Yao, S.-W. Huang, C. W. Wong, and A. K. Vinod, *Graphene microcavity frequency combs and related methods of manufacturing*, pending.
8. S.-W. Huang, and B. Li, *Bidirectional mode-locked fiber laser and associated methods*, pending.
9. S.-W. Huang, K. Jia, X. Wang, Z. Xie, and S.-N. Zhu, *Method and device for generating optical frequency comb*, pending.
10. S.-W. Huang, and B. Li, *Systems and methods for time-magnified photon counting*, pending.

INVITED TALKS (since 2017)

1. "Ultrafast dynamics and precision stabilization in chip-scale optical frequency combs", OSA Integrated Optics technical group webinar series, virtual platform (12/08/2016).
2. "Ultrafast dynamics and stabilization in chip-scale optical frequency combs", SPIE Photonics West, San Francisco, USA (01/28/2017).
3. "Frequency comb and pattern formation dynamics in chip-scale nonlinear oscillators", 5th UESTC International Forum for Young Scholars, Chengdu, China (11/24/2017).
4. "Kerr frequency comb - a tiny revolution for future metrology", Department of physics Wednesday seminar series, Miami University, USA (11/14/2018).
5. "Kerr frequency comb - a tiny revolution for future metrology", SESE nanophotonics seminar series, Nanjing University, China (12/10/2018).
6. "Kerr frequency comb - a tiny revolution for future metrology", special seminar on microcomb sources, Nankai University, China (12/14/2018).
7. "Pulse formation dynamics in nonlinear photonic platforms", 10th International Conference on Materials for Advanced Technologies (ICMAT 2019), Singapore, Singapore (June 23-28, 2019).
8. "Chip-scale THz hyperspectral imaging", 2020 SPIE Defense + Commercial Sensing (SPIE DCS), Anaheim, USA (April 26-30, 2020).
9. "Photonic frequency comb based on dissipative Kerr and Quadratic solitons", Chinese Optical Society Photonics Open Courses, virtual platform (07/03/2021).
10. "Photonic frequency comb based on dissipative Kerr and Quadratic solitons", 2021 Joint Conference of European Frequency and Time Forum & the IEEE International Frequency Control Symposium (EFTF-IFCS 2021), virtual platform (July 11-17, 2021).

PUBLICATION LIST total citations: 4064, h-index: 37, i-10 index: 54

(My CUB mentees are marked in bold.)

1. X. Wang, K. Jia, M. Chen, […], **S.-W. Huang**, Z. Xie, and S.-N. Zhu, 2 μm optical frequency comb generation via optical parametric oscillation from a lithium niobate optical superlattice box resonator, *Photon. Res.*, accepted.
2. **E. Tsao, Y. Xie, M. Nie,** and **S.-W. Huang**, Monostable dissipative Kerr solitons, *Opt. Lett.* 47, 122 (2022).
3. K. Jia, X. Wang, J. Guo, […], **S.-W. Huang**, *et al.*, Mid-infrared tunable laser with noncritical frequency matching in box resonator geometry, *Phys. Rev. Lett.* **127**, 213902 (2021).
4. X. Ni, K. Jia, X. Wang, […], **S.-W. Huang**, *et al.*, Broadband sheet parametric oscillator for optical frequency comb generation via cavity phase matching, *Chin. Phys. Lett.* **38**, 64201 (2021).
5. **B. Li, J. Bartos, Y. Xie**, and **S.-W. Huang**, Time-magnified photon counting with a 550-fs resolution, *Optica* **8**, 1109 (2021).
6. **M. Nie, Y. Xie**, and **S.-W. Huang**, Deterministic generation of parametrically driven dissipative Kerr soliton, *Nanophotonics* **10**, 1691 (2021).

7. A. K. Vinod, **S.-W. Huang**, J. Yang, *et al.*, Frequency microcomb stabilization via dual-microwave control, *Commun. Phys.* **4**, 81 (2021).
8. **C. Chen**, **Y. Xie**, and **S.-W. Huang**, Nanophotonic optical gyroscope with sensitivity enhancement around "mirrored" exceptional points, *Opt. Commun.* **483**, 126674 (2021).
9. (INVITED) **B. Li**, S. Wang, Y. Wei, **S.-W. Huang**, and K. K.-Y. Wong, Temporal imaging for ultrafast spectral-temporal optical signal processing and characterization, *IEEE J. Sel. Top. Quantum Electron.* **27**, 7600613 (2021).
10. **K. Jia**, **X. Wang**, D. Kwon, **J. Wang, E. Tsao, H. Liu**, […], and **S.-W. Huang**, Photonic flywheel in a monolithic fiber resonator, *Phys. Rev. Lett.* **125**, 143902 (2020).
11. B. Yao, C. Qin, K. Jia, Q. Li, T. Tan, X. Wang, Y. Guo, **S.-W. Huang**, *et al.*, Electrically controllable laser frequency combs in graphene-fiber microresonators, *Light Sci. Appl.* **9**, 185 (2020).
12. **C. Chen**, and **S.-W. Huang**, The generation of non-conventional beam in a nonlinear electro-optic photonic crystal, *Jpn. J. Appl. Phys.* **59**, 092003 (2020).
13. T. Tan, C. Peng, Z. Yuan, X. Xie, H. Liu, Z. Xie, **S.-W. Huang**, *et al.*, Predicting Kerr soliton combs in microresonators via deep neural networks, *J. Lightwave Technol.* **38**, 6591 (2020).
14. **B. Li**, J. Xing, **Y. Xie**, D. Kwon, **Y. Xie**, **N. Prakash**, J. Kim, and **S.-W. Huang**, Bidirectional mode-locked all-normal dispersion fiber laser, *Optica* **7**, 961 (2020).
15. **M. Nie**, and **S.-W. Huang**, Symbiotic quadratic solitons mode-locked non-degenerate dispersive optical parametric oscillators, *Opt. Lett.* **45**, 4184 (2020).
16. H. Zhou, X. Zhu, T. Gu, J. Wu, G. Deng, **S.-W. Huang**, *et al.*, Error-free data transmission through fast broadband all-optical modulation in graphene-silicon optoelectronics, *Appl. Phys. Lett.* **116**, 221106 (2020).
17. **M. Nie**, and **S.-W. Huang**, Quadratic solitons in singly resonant degenerate optical parametric oscillators, *Phys. Rev. Applied* **13**, 044046 (2020).
18. Y. Li, **S.-W. Huang***, B. Li, *et al.*, Real-time transition dynamics and stability of chip-scale dispersion-managed frequency microcombs, *Light Sci. Appl.* **9**, 52 (2020). *equal contribution and corresponding author
19. **M. Nie**, and **S.-W. Huang**, Quadratic soliton mode-locked degenerate optical parametric oscillator, *Opt. Lett.* **45**, 2311 (2020).
20. J. Yang, **S.-W. Huang**, Z. Xie, *et al.*, Coherent satellites in multi-spectral regenerative frequency microcombs, *Commun. Phys.* **3**, 27 (2020).
21. Z. Cao, B. Yao, C. Qin, R. Yang, Y. Guo, Y. Zhang, Y. Wu, L. Bi, Y. Chen, Z. Xie, G. Peng, **S.-W. Huang**, *et al.*, Biochemical sensing in graphene-enhanced microfiber resonators with individual molecule sensitivity and selectivity, *Light Sci. Appl.* **8**, 107 (2019).
22. **M. Nie**, **J. Wang**, and **S.-W. Huang**, Solid-state Mamyshev oscillator, *Photon. Res.* **7**, 1175 (2019).
23. H. Zhou, Y. Geng, W. Cui, **S.-W. Huang**, *et al.*, Soliton bursts and deterministic dissipative Kerr soliton generation in auxiliary-assisted microcavities, *Light Sci. Appl.* **8**, 50 (2019).
24. B. Yao, **S.-W. Huang***, Y. Liu, *et al.*, Gate-tunable frequency combs in graphene-nitride microresonators, *Nature* **558**, 410 (2018). *equal contribution and corresponding author
25. Y. Geng, X. Huang, W. Cui, Y. Ling, B. Xu, J. Zhang, X. Yi, B. Wu, **S.-W. Huang**, *et al.*, Terabit optical OFDM superchannel transmission via coherent carriers of a hybrid chip-scale soliton frequency comb, *Opt. Lett.* **43**, 2406 (2018).
26. C. Choi, J. Huang, H.-C. Cheng, H. Kim, A. K. Vinod, S.-H. Bae, V. O. Özçelik, R. Grassi, J. Chae, **S.-W. Huang**, *et al.*, Enhanced interlayer neutral excitons and trions in trilayer van der Waals heterostructures, *npj 2D Mater. Appl.* **2**, 30 (2018).

27. B. Yao, Y. Liu, **S.-W. Huang**, *et al.*, Broadband gate-tunable THz plasmons in graphene heterostructures, *Nature Photon.* **12**, 22 (2017).
28. **S.-W. Huang**, J. Yang, S.-H. Yang, *et al.*, Globally stable microresonator Turing pattern formation for coherent high-power THz radiation on-chip, *Phys. Rev. X* **7**, 041002 (2017).
29. B. Li, **S.-W. Huang***, Y. Li, *et al.*, Panoramic-reconstruction temporal imaging for seamless measurements of slowly-evolved femtosecond pulse dynamics, *Nature Commun.* **8**, 61 (2017). *equal contribution and corresponding author
30. H. Zhou, **S.-W. Huang***, X. Li, *et al.*, Real-time dynamics and cross-correlation gating spectroscopy of free-carrier Drude slow-light solitons, *Light Sci. Appl.* **6**, e17008 (2017). *equal contribution
31. **S.-W. Huang**, A. K. Vinod, J. Yang, *et al.*, Quasi-phase-matched multispectral Kerr frequency comb, *Opt. Lett.* **42**, 2110 (2017).
32. J. Wu, **S.-W. Huang***, Y. Huang, *et al.*, Mesoscopic chaos mediated by Drude electron-hole plasma in silicon optomechanical oscillators, *Nature Commun.* **8**, 15570 (2017). *equal contribution
33. B. Yao, C. Yu, Y. Wu, **S.-W. Huang**, *et al.*, Graphene-enhanced Brillouin optomechanical microresonator for ultrasensitive gas detection, *Nano Lett.* **17**, 4996 (2017).
34. B. C. Yao, Y. J. Rao, **S.-W. Huang**, *et al.*, Graphene Q-switched distributed feedback fiber lasers with narrow linewidth approaching the transform limit, *Opt. Express* **25**, 8202 (2017).
35. J. Lim, A. A. Savchenkov, A. B. Matsko, **S.-W. Huang**, *et al.*, Microresonator-stabilized extended cavity diode laser for supercavity frequency stabilization, *Opt. Lett.* **42**, 1249 (2017).
36. A. B. Matsko, A. A. Savchenkov, **S.-W. Huang**, *et al.*, Clustered frequency comb, *Opt. Lett.* **41**, 5102 (2016).
37. H. Zhou, M. L. Liao, **S.-W. Huang**, *et al.*, Six-wave mixing induced by free-carrier plasma in silicon nanowire waveguides, *Laser Photon. Rev.* **10**, 1054 (2016).
38. **S.-W. Huang**, J. Yang, M. Yu, *et al.*, A broadband chip-scale optical frequency synthesizer at 2.7×10^{-16} relative uncertainty, *Science Adv.* **2**, e1501489 (2016).
39. J. Lim, **S.-W. Huang**, A. Kumar, *et al.*, Stabilized chip-scale Kerr frequency comb via a high-*Q* reference photonic microresonator, *Opt. Lett.* **41**, 3706 (2016).
40. **S.-W. Huang**, H. Liu, J. Yang, *et al.*, Smooth and flat phase-locked Kerr frequency comb generation by higher order mode suppression, *Sci. Rep.* **6**, 26255 (2016).
41. H. Zhou, **S.-W. Huang**, Y. Dong, *et al.*, Stability and intrinsic fluctuations of dissipative cavity solitons in Kerr frequency microcombs, *IEEE Photonics Journal* **7**, 3200113 (2015).
42. **S.-W. Huang**, J. Yang, J. Lim, *et al.*, A low-phase-noise 18 GHz Kerr frequency microcomb phase-locked over 65 THz, *Sci. Rep.* **5**, 13355 (2015).
43. **S.-W. Huang**, H. Zhou, J. Yang, *et al.*, Mode-locked ultrashort pulse generation from on-chip normal dispersion microresonators, *Phys. Rev. Lett.* **114**, 053901 (2015).
44. (INVITED) C. Manzoni, O. D. Mücke, G. Cirmi, S. Fang, J. Moses, **S.-W. Huang**, *et al.*, Coherent pulse synthesis: towards sub-cycle optical waveforms, *Laser Photon. Rev.* **9**, 129 (2015).
45. (INVITED) W. R. Huang, **S.-W. Huang**, E. Granados, *et al.*, Highly efficient terahertz pulse generation by optical rectification in cryogenically cooled lithium niobate, *J. Mod. Opt.* **62**, 1486 (2015, special issue on Physics with Strong THz Fields).
46. X. Luan, Y. Huang, Y. Li, J. F. McMillan, J. Zheng, **S.-W. Huang**, *et al.*, An integrated low phase noise radiation-pressure-driven optomechanical oscillator chipset, *Sci. Rep.* **4**, 6842 (2014).
47. H. Suchowski, P. R. Krogen, **S.-W. Huang**, *et al.*, Octave-spanning coherent mid-IR generation via adiabatic difference frequency conversion, *Opt. Express* **21**, 28892 (2013, special issue on Nonlinear Optics).

48. C.-J. Lai, G. Cirmi, K.-H. Hong, J. Moses, **S.-W. Huang**, *et al.*, Wavelength scaling of high harmonic generation close to the multiphoton ionization regime, *Phys. Rev. Lett.* **111**, 073901 (2013).
49. **S.-W. Huang**, E. Granados, W. R. Huang, *et al.*, High conversion efficiency, high energy THz pulses by optical rectification in cryogenically cooled lithium niobate, *Opt. Lett.* **38**, 796 (2013).
50. H.-W Chen, J.K. Lim, **S.-W. Huang**, *et al.*, Optimization of femtosecond Yb-doped fiber amplifiers for high-quality pulse compression, *Opt. Express* **20**, 28672 (2012).
51. K.-H. Hong, C.-J. Lai, V.-M. Gkortsas, **S.-W. Huang**, *et al.*, High-order harmonic generation in Xe, Kr, and Ar driven by a 2.1-μm source: high-order harmonic spectroscopy under macroscopic effects, *Phys. Rev. A* **86**, 043412 (2012).
52. G. Cirmi, C.-J. Lai, E. Granados, **S.-W. Huang**, *et al.*, Cut-off scaling of high-harmonic generation driven by a femtosecond visible optical parametric amplifier, *J. Phys. B: At. Mol. Opt. Phys.* **45**, 205601 (2012).
53. **S.-W. Huang**, J. Moses, and F. X. Kärtner, Broadband non-collinear optical parametric amplification without angularly dispersed idler, *Opt. Lett.* **37**, 2796 (2012).
54. C. Manzoni, **S.-W. Huang**, G. Cirmi, *et al.*, Coherent synthesis of ultra-broadband optical parametric amplifiers, *Opt. Lett.* **37**, 1880 (2012).
55. (INVITED) Y. Chen, **S.-W. Huang***, C. Zhou, *et al.*, Improved detection sensitivity of line-scanning optical coherence microscopy, *IEEE J. Sel. Top. Quant. Electron.* **18**, 1094 (2012). *equal contribution
56. (INVITED) **S.-W. Huang**, G. Cirmi, J. Moses, *et al.*, Optical waveform synthesizer and its application to high-harmonic generation, *J. Phys. B: At. Mol. Opt. Phys.* **45**, 074009 (2012).
57. K.-H. Hong, **S.-W. Huang**, J. Moses, *et al.*, High-energy, phase-stable, ultrabroadband kHz OPCPA at 2.1 μm pumped by a picosecond cryogenic Yb:YAG laser, *Opt. Express* **19**, 15538 (2011).
58. **S.-W. Huang**, G. Cirmi, J. Moses, *et al.*, High-energy pulse synthesis with sub-cycle waveform control for strong-field physics, *Nature Photon.* **5**, 475 (2011).
59. J. Moses, and **S.-W. Huang**, Conformal profile theory for performance scaling of ultrabroadband optical parametric chirped pulse amplification, *J. Opt. Soc. Am. B* **28**, 812 (2011).
60. K.-H. Hong, J. T. Gopinath, D. Rand, A. M. Siddiqui, **S.-W. Huang**, *et al.*, High-energy, kHz-repetition-rate, ps cryogenic Yb:YAG chirped-pulse amplifier, *Opt. Lett.* **35**, 1752 (2010).
61. E. L. Falcao-Filho, C.-J. Lai, K.-H. Hong, V. M. Gkortsas, **S.-W. Huang**, *et al.*, Scaling of high-order harmonic efficiencies with visible wavelength drivers: A route to efficient extreme ultraviolet sources, *Appl. Phys. Lett.* **97**, 061107 (2010).
62. A. D. Aguirre, J. Sawinski, **S.-W. Huang**, *et al.*, High speed optical coherence microscopy with autofocus adjustment and a miniaturized endoscopic imaging probe, *Opt. Express* **18**, 4222 (2010).
63. J. Moses, C. Manzoni, **S.-W. Huang**, *et al.*, Temporal optimization of ultrabroadband high-energy OPCPA, *Opt. Express* **17**, 5540 (2009).
64. J. Moses, **S.-W. Huang**, K.-H. Hong, *et al.*, Highly stable ultrabroadband mid-IR optical parametric chirped-pulse amplifier optimized for superfluorescence suppression, *Opt. Lett.* **34**, 1639 (2009).
65. D. C. Adler, **S.-W. Huang**, R. Huber, and J. G. Fujimoto, Photothermal detection of gold nanoparticles using phase-sensitive optical coherence tomography, *Opt. Express* **16**, 4376 (2008).
66. P. M. Andrews, Y. Chen, **S.-W. Huang**, *et al.*, High-resolution optical coherence tomography imaging of the living kidney, *Lab. Invest.* **88**, 441 (2008).
67. Y. Chen, A. D. Aguirre, P.-L. Hsiung, **S.-W. Huang**, *et al.*, Effects of axial resolution improvement on optical coherence tomography (OCT) imaging of gastrointestinal tissues, *Opt. Express* **16**, 2469 (2008).
68. W.-J. Chen, Z.-M. Hsieh, **S.-W. Huang**, *et al.*, Sub-single-cycle optical pulse train with constant carrier envelope phase, *Phys. Rev. Lett.* **100**, 163906 (2008).

69. **S.-W. Huang**, A. D. Aguirre, R. A. Huber, *et al.*, Swept source optical coherence microscopy using a Fourier domain mode-locked laser, *Opt. Express* **15**, 6210 (2007).
70. Y. Chen, **S.-W. Huang**, A. D. Aguirre, *et al.*, High-resolution line-scanning optical coherence microscopy, *Opt. Lett.* **32**, 1971 (2007).
71. Y. Chen, A. D. Aguirre, P.-L. Hsiung, D. Desai, P. R. Herz, M. Pedrosa, Q. Huang, M. Figueiredo, **S.-W. Huang**, *et al.*, Ultrahigh resolution optical coherence tomography of Barrett's esophagus: preliminary descriptive clinical study correlating images with histology, *Endoscopy* **39**, 599 (2007).
72. H. Mashimo, Y. Chen, **S.-W. Huang**, *et al.*, Endoscopic optical coherence tomography reveals Barrett's underneath squarnous neo-epithelium after radiofrequency ablation, *Gastroenterology* **132**, A96 (2007).
73. **S.-W. Huang**, W.-J. Chen, and A.-H. Kung, Vibrational molecular modulation in hydrogen, *Phys. Rev. A* **74**, 063825 (2006).
74. **S.-W Huang**, H.-Y. Mong, and C.-H. Lee, Super-resolution bright-field optical microscopy based on nanometer topographic contrast, *Microsc. Res. Tech.* **65**, 180 (2004).

FUNDING HISTORY

1. Air Force Office of Scientific Research, Mar 2015-Mar 2018, Huang portion $450,000, PI
   Sub-cycle optical pulse synthesis and stabilization in next-generation optical frequency combs
2. College of Engineering & Applied Science, Mar 2018-Aug 2018, Huang portion $10,000, PI
   High-definition live 3D deep tissue nonlinear microscopic tomography
3. CUbit Quantum Initiative, Jul 2018-Dec 2018, Huang portion $45,000, PI
   Chip-scale squeezed light optical magnetometer
4. Office of Naval Research, Apr 2019-Mar 2024, Huang portion $542,002, co-PI
   Short-pulse tunable source and amplifier for long-wavelength infrared
5. College of Engineering & Applied Science, Mar 2019-Aug 2019, Huang portion $12,000, PI
   Deep tissue imaging for diagnostics of musculoskeletal disorders
6. Burroughs Wellcome Fund, Jun 2020-Dec 2021, Huang portion $11,000, PI
   Multimodal optical biopsy for early-stage osteoarthritis detection
7. DOE Center for Integrated Nanotechnologies, Jul 2020-Jun 2022, User facility grant, PI
   Microresonator frequency comb based on interaction between second- and third-order nonlinearities
8. Research & Innovation Office, Jul 2020-Dec 2021, Huang portion $22,500, PI
   Novel optical magnetometer for room-temperature magnetoencephalography
9. National Science Foundation, Sep 2020-Aug 2025, Huang portion $377,657, SI
   Quantum Systems through Entangled Science and Engineering (Q-SEnSE)
10. AQronos, inc., Jan 2021-Dec 2022, Huang portion $405,000, PI
    Chip-scale gyroscope based on parametric exceptional point
11. National Science Foundation, Feb 2021-Jan 2026, Huang portion $500,000, PI
    CAREER: dual-comb photoacoustic microscopy with super-resolution wavefront shaping
12. Engineering Excellence Fund, May 2021-Mar 2022, $60,000, co-PI
    Next generation quantum optical engineering labs
13. National Institute of Health, Aug 2021-Jul 2023, Huang portion $197,167, PI
    Nanoparticle-based optical magnetometer for room-temperature magnetoencephalography
14. Office of Naval Research, Apr 2022-Mar 2025, Huang portion $452,405, PI
    Quadratic soliton mode-locked optical parametric oscillator in the mid-infrared