

LINGZE DUAN

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EDUCATION

Ph.D. Electrical Engineering	University of Maryland (College Park, MD)	2002
M.S. Electrical Engineering	University of Maryland (College Park, MD)	1998
B.S. Physics	Tsinghua University (Beijing, China)	1995

PROFESSIONAL EMPLOYMENT

Associate Professor	Physics Department, UAH	2013 – present
Assistant Professor	Physics Department, UAH	2007 – 2013
Postdoctoral Fellow	Physics Department, Penn State University	2004 – 2007
Postdoctoral Associate	Research Lab of Electronics, MIT	2002 – 2004

PROFESSIONAL MEMBERSHIPS

Senior Member, Institute of Electrical and Electronics Engineers (IEEE)
Member, IEEE Photonics Society (IPS)
Member, Optical Society of America (OSA)

AWARDS

NSF CAREER Award	National Science Foundation	2013
Goldhaber Travel Award	University of Maryland	2002
Best Diploma Thesis	Tsinghua University	1995
Li Qing Fellowship	Tsinghua University	1994

RESEARCH INTERESTS

Precision Frequency Metrology

Optical frequency combs, optical clockwork, precision metrology, imaging and spectroscopy.

Ultrafast Nanophotonics

Coherent carrier dynamics in semiconductor quantum dots, semiconductor CEP detection.

Fiber-Optic Sensing

Thermal noises-limited fiber-optic sensing, fiber-optic infrasound sensors, fiber lasers.

Astro Optics

Optical means to search intergalactic baryons, phase noise reduction in radio telescopes.

MAJOR GRANTS

External Grants

- 2013-2018 **NSF-CAREER (PI, \$400k):** Semiconductor detectors for direct probing of the absolute phase of light (ECCS-1254902)
- 2015-2016 **AL ACHE GRSP (PI, \$25k):** Fiber-optic sensing at the femtostrain level
- 2013-2016 **NASA EPSCoR RID (PI, \$48k):** Compact, low-cost semiconductor lasers with ultra-high frequency stability (NNX13AB09A)
- 2012-2016 **AL ACHE GRSP (PI, \$100k):** High-resolution dynamic range metrology using a femtosecond-laser frequency comb
- 2011-2014 **NSF-MRI (PI, \$280k):** Acquisition of Menlo Systems FC1500 Optical Frequency Synthesizer (ECCS-1040019)
- 2011-2012 **NASA EPSCoR RID (PI, \$15k):** High-Precision Remote Measurement of Target Kinematics based on Femtosecond Frequency Comb Lasers (NNX07AL52A)

Internal Grants

- 2014-2015 **UAH IIDR (PI, \$38k):** Sol-Gel Fabrication of II-VI Quantum Dot Sensors for Ultrafast Nano-Photonics Research
- 2013-2015 **UAH CCFR (PI, \$10k):** Fundamental thermomechanical noise in fiber-optic strain sensors
- 2013-2016 **UAH RIF (PI, \$119k):** Ultrafast nanophotonics on the optical-cycle scale
- 2008-2010 **UAH Mini-Grants & JFDR (PI, \$38k):** Atmospheric Delivery of Microwave Clocks using Optical Frequency Combs; Feasibility analysis of using fiber Fabry-Perot cavities for ultrahigh precision laser frequency stabilization; Octave-spanning coherent super-continuum generation based on a femtosecond fiber laser; Rapid scanning optical coherence tomography based on a single femtosecond laser.
- 2008-2009 **UAH UR11 (PI, \$8.5k):** Free-Space Transmission of an Optical Frequency Comb

COURSES TAUGHT

PH112	General Physics with Calculus II	(4 credits)
PH115	General Physics Lab II	(2 credits)
PH310	Intermediate Lab I	(2 credits)
OPT341	Geometrical Optics	(3 credits)
OPT342	Physical Optics	(3 credits)
OPT411	Geometrical Optics Lab	(2 credits)
OPT412	Physical Optics Lab	(2 credits)
OPT442	Interference and Diffraction	(3 credits)
PH632	Fourier Optics	(3 credits)
PH645	Lasers I	(3 credits)
PH733	Quantum Devices	(3 credits)
PH745	Lasers II	(3 credits)

ADVISING ACTIVITIES

Ph.D. dissertation: 1
M.S. theses: 3
Senior Capstone projects: 10
REU projects: 4
Current graduate students: 8

SYNERGISTIC ACTIVITIES

Professional Services:

- ◆ Reviewer for the following scientific journals:
 - Optics Express (OSA)
 - Optics Letters (OSA)
 - Applied Optics (OSA)
 - Journal of Optical Society of America B (OSA)
 - Photonic Research (OSA)
 - Journal of Quantum Electronics (IEEE)
 - Journal of Lightwave Technology (IEEE/OSA)
 - Photonics Technology Letters (IEEE)
 - Applied Physics Letters (AIP)
 - Review of Scientific Instruments (AIP)
- ◆ OSA Photonic Detection technical group executive committee (2015 – present)
- ◆ NSF Proposal Review Panelist (2009, 2011 & 2012).
- ◆ NASA Postdoc Program Review Panelist (2011–2014 annually).
- ◆ Oak Ridge Associated Universities Ralph Powe Award Referee (2014 & 2015)
- ◆ Session Chair – Frontier in Optics/OSA Annual Meeting (2010).

Societal Services

- ◆ Program Chair of Huntsville Electro-Optical Society (Huntsville chapters of OSA and SPIE).
- ◆ Event supervisor in the North Alabama Regional Science Olympiad (2008–2014 annually).
- ◆ Topical Judge in Alabama Science and Engineering Fair (2008–2014 annually).
- ◆ Instructor in NSF-sponsored Hands-On-Optics training class for 5th-grade teachers (2009).
- ◆ Founder and Faculty Supervisor for UAH Society of Optics Students (SOS)

PUBLICATIONS

Journal/Book Publications

- ◆ Lingze Duan, “Ultrafast optical sampling finds applications in metrology (invited),” J. Sci. Industrial Metrology, *in preparation*.
- ◆ Lin Yang and Lingze Duan, “Depth-resolved imaging based on optical sampling by cavity tuning,” IEEE Photon. Tech. Lett. **27**, 1761-1764 (2015).

- ♦ Changjun Hu, Ravi P. Gollapalli, Lin Yang, and Lingze Duan, "Excess phase noise characterization in multifrequency remote clock distribution based on femtosecond frequency combs," *Appl. Sci.* **5**, 77-87 (2015).
- ♦ Hemang Jani and Lingze Duan, "Acid-free sol-gel fabrication of glass thin films embedded with II-VI colloidal quantum dots," *J. Nanophotonics* **9**, 093072 (2015).
- ♦ Lingze Duan, "Thermal noise-limited fiber-optic sensing at infrasonic frequencies," *IEEE J. Quantum Electron.* **51**, 7700106 (2015).
- ♦ Richard Lieu, Tom W. B. Kibble, and Lingze Duan, "A method to improve the sensitivity of radio telescopes," *ApJ* **798**, 67 (2015).
- ♦ Richard Lieu, Lingze Duan, and Tom W. B. Kibble, "Measurement of the dispersion of radiation from a steady cosmological source," *ApJ*. **778**, 73 (2013).
- ♦ Richard Lieu and Lingze Duan, "A new way of detecting intergalactic baryons," *ApJ Lett.* **763**, L44 (2013).
- ♦ Lin Yang, Jinsong Nie, and Lingze Duan, "Dynamic optical sampling by cavity tuning and its application in lidar," *Opt. Express* **21**, 3850-3860 (2013).
- ♦ Jinsong Nie, Lin Yang, and Lingze Duan, "Atmospheric transfer of a radio-frequency clock signal with a diode laser," *Appl. Opt.* **51**, 8190-8194 (2012).
- ♦ Lingze Duan, "A general treatment of the thermal noises in optical fibers," *Phys. Rev. A* **86**, 023817 (2012).
- ♦ Lingze Duan and Ravi P. Gollapalli, "Atmospheric clock transfer based on femtosecond frequency combs," in *Photodetector*, edited by Sanka Gateva, (INTECH, 2011, ISBN 979-953-307-350-6) Ch. 16.
- ♦ Ravi P. Gollapalli and Lingze Duan, "Multiheterodyne characterization of excess phase noise in atmospheric transfer of a femtosecond-laser frequency comb," *J. Lightwave Technol.* **29**, 3401-3407 (2011).
- ♦ Lingze Duan, "Intrinsic thermal noise of optical fibers due to mechanical dissipation," *Electron. Lett.* **46** (2010).
- ♦ Ravi P. Gollapalli and Lingze Duan, "Atmospheric timing transfer using a femtosecond frequency comb," *IEEE Photon. Journal* **2**, 904-910 (2010).
- ♦ Ayshah Alatawi, Ravi P. Gollapalli, and Lingze Duan, "Radio frequency clock delivery via free-space frequency comb transmission," *Opt. Lett.* **34**, 3346-3348 (2009).
- ♦ Lingze Duan and Kurt Gibble, "Locking lasers with large FM noise to high-Q cavities," *Opt. Lett.* **30**, 3317-3319 (2005).
- ♦ Christian Jirauschek, Lingze Duan, Oliver D. Mücke, Franz X. Kaertner, Klaus. D. Hof, Thorsten Tritschler, and Martin D. Wegener, "Carrier-envelope phase sensitive inversion," *J. Opt. Soc. Am. B* **22**, 2065-2075 (2005).
- ♦ Lingze Duan, Mario Dagenais and Julius Goldhar, "Smoothly wavelength-tunable picosecond pulse generation using a harmonically mode-locked fiber ring laser," *J. Lightwave Technol.* **21**, 930-937 (2003).

- ◆ Lingze Duan, Christopher J. K. Richardson, Zhaoyang Hu, Mario Dagenais and Julius Goldhar, “A stable, smoothly wavelength-tunable picosecond pulse generator,” *IEEE Photon. Technol. Lett.* **14**, 840-842 (2002).
- ◆ A. N. Vlasov, A. G. Shkvarunets, J. Rodgers, Y. Carmel, T. M. Antonsen Jr., T. Abu-Elfadi, L. Duan, V. A. Cherpenin, G. S. Nusinovich, M. Botton, and V. L. Granatstein, “Overmoded GW-class surface wave microwave oscillator,” *IEEE Trans Plasma Sci.* **28**, 550-560 (2000).
- ◆ A. G. Shkvarunets, S. Kobayashi, Y. Carmel, J. Rodgers, T. M. Antonsen Jr., L. Duan, and V. L. Granatstein, “Operation of a relativistic backward-wave oscillator filled with a preionized, high-density radially inhomogeneous plasma,” *IEEE Trans. Plasma Sci.* **26**, 646-652 (1998).
- ◆ S. Kobayashi, M. Botton, Y. Carmel, T. M. Antonsen Jr., J. Rodgers, A. G. Shkvarunets, A. N. Vlasov, L. Duan, and V. L. Granatstein, “Electromagnetic properties of periodic cavities coupled to a radiating antenna,” *IEEE Trans. Plasma Sci.* **26**, 947-954 (1998).
- ◆ Lingze Duan, Quanfeng Li, and Yumin Hu, “Experimental research on microwave measurement of moisture in tobacco,” *Journal of Microwaves* **12**, 62-67 (1996).

Refereed Conference Publications

- ◆ Lingze Duan, "Probing the intrinsic thermal noise of optical fibers at infrasonic frequencies," in *Frontiers in Optics 2015*, OSA Technical Digest (online) (Optical Society of America, 2015), paper FTh4E.3.
- ◆ Lin Yang and Lingze Duan, "Optical coherence tomography and profilometry based on optical sampling by cavity tuning," in *Frontiers in Optics 2015*, OSA Technical Digest (online) (Optical Society of America, 2015), paper FW4E.4.
- ◆ Hemang Jani and Lingze Duan, "Acid-free Sol-Gel fabrication of quantum-dot thin films for ultrafast nanophotonics research," *2015 IEEE Photonics Conference* (Oct. 4-8, Reston, VA), TuH 2.5.
- ◆ Ravi P. Gollapalli, Changjun Hu, Lin Yang, and Lingze Duan, "Multiheterodyne measurement of acoustically induced phase noise in fiber-optic transfer of an optical frequency comb," *2015 IEEE Photonics Conference* (Oct. 4-8, Reston, VA), ThB 1.3.
- ◆ Lin Yang, Jinsong Nie, and Lingze Duan, “A lidar based on optical sampling by cavity tuning,” in *Conference on Lasers and Electro-Optics (CLEO), 2013*, Technical Digest (Optical Society of America, 2013), paper JW2A.
- ◆ Lingze Duan, “Intrinsic thermodynamic noise in passive fiber systems,” in *Frontiers in Optics (FiO)/Laser Science XXVI (LS) Conference, 2012*, Technical Digest (Optical Society of America, 2012), paper FTh1D.
- ◆ Lingze Duan, “Structural damping-induced thermal noise in fiber interferometric systems,” in *Frontiers in Optics (FiO)/Laser Science XXVI (LS) Conference, 2010*, Technical Digest (Optical Society of America, 2010), paper FMC3.
- ◆ Ravi P. Gollapalli and Lingze Duan, “Delivery of optical frequency references through atmosphere using a frequency comb,” in *Frontiers in Optics (FiO)/Laser Science XXVI (LS) Conference, 2010*, Technical Digest (Optical Society of America, 2010), paper FTuL5.

- ♦ Ravi P. Gollapalli and Lingze Duan, “Atmospheric delivery of a microwave clock using an optical frequency comb,” in *Conference on Lasers and Electro-Optics (CLEO), 2010*, Technical Digest (Optical Society of America, 2010), paper CTuDD2.
- ♦ Lingze Duan and Kurt Gibble, “Locking lasers with large FM noise to high-Q cavities,” *Frontier in Optics (FiO) 2005*, Technical Digest (Optical Society of America, 2005), paper FMF6.
- ♦ Lingze Duan and Kurt Gibble, “Locking lasers with large FM noise to high-Q cavities,” *Frequency Control Symposium and Exposition 2005*, Proceedings of the 2005 IEEE International, pp. 928-931, August, 2005.
- ♦ Christian Jirauschek, Lingze Duan, Oliver D. Mücke, Franz X. Kaertner, Klaus. D. Hof, Thorsten Tritschler, and Martin D. Wegener, “Semiconductor-based carrier-envelope phase detection,” in *Conference on Lasers and Electro-Optics (CLEO) 2004*, Technical Digest (Optical Society of America, 2004), paper JTuB2.
- ♦ Christian Jirauschek, Juhi Chandalia, Lingze Duan, Franz X. Kaertner, Oliver D. Mücke, Thorsten Tritschler, and Martin D. Wegener, “Opto-electronic carrier-envelope-phase detection,” in Digest of *LEOS Summer Topical Meetings: Holey Fibers and Photonic Crystals / Polarization Mode Dispersion / Photonics Time / Frequency Measurement and Control*, (Optical Society of America, 2003), TuC2.3/41-42.
- ♦ Lingze Duan, James Jones and Julius Goldhar, “The characterization of a simple, smoothly wavelength-tunable harmonically mode-locked fiber ring laser,” in *Conference on Lasers and Electro-Optics (CLEO) 2003*, Technical Digest (Optical Society of America, 2003), paper CWD1.
- ♦ Lingze Duan, Christopher J. K. Richardson, Mario Dagenais and Julius Goldhar, “Study of a dispersion-tuned, harmonically mode-locked fiber ring laser with a SOA,” in *Conference on Lasers and Electro-Optics (CLEO) 2002*, Technical Digest (Optical Society of America, 2003), paper CThR5.
- ♦ Lingze Duan, Christopher J. K. Richardson, Zhaoyang Hu, Mario Dagenais and Julius Goldhar, “A stable, dispersion-tuned harmonically mode-locked fiber ring laser using a SOA,” in *Optical Fiber Communication Conference (OFC) 2002*, Technical Digest (Optical Society of America, 2002), paper ThGG27.