

# Curriculum Vitae

## Personal Data

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## Education

- Ph.D.** 1999 - 2001 High Frequency and Quantum Electronics Laboratory (IHQ),  
University of Karlsruhe, Germany  
**Major:** High repetition rate solid-state lasers in theory and experiment  
**Title:** Continuous mode-locking of solid state lasers  
**Advisor:** Prof. F. X. Kärtner
- M.S.** 1992 - 1999 Swiss Federal Institute of Technology (ETH), Zürich, Switzerland  
**Major:** Quantum electronics  
**Thesis:** 'Stability-analysis of fiber- and waveguide lasers with high repetition rates.' Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts. (1998 - 1999)  
**Advisors:** Prof. F. X. Kärtner and Prof. P. Günter

## Research Funding

- [2017-2019] DARPA STTR W31P4Q-18-C-0002 (Army Redstone): *Ultra-Stable, Portable Fabry-Perot Cavities*, PI: Mark Notcutt, Boulder Precision Electro-Optics. (Phase II: \$749,971; sub-contract: \$359,966)
- [2014] SBIR AF141-126, *Optical System for Precision Atomic Clocks* (Phase 1: \$150,000; sub-contract: \$20,000)
- [2013-2018] DARPA PULSE program with with a grant from AMRDEC, *Portable optical frequency comb systems for the generation of ultralow phase noise microwave signals*, PI: Scott Diddams, NIST Boulder (Total: \$7,082,475; sub-award: \$1,197,449)
- [2013] Private sector Gift Fund in recognition of the '*numerous highly creative and novel applications [...] in the highly competitive field of graphene technology*', PI: T.R. Schibli (\$25,000)
- [2010-2011] Innovative Seed Grant, *Graphene-based wavelength-independent ultrafast optical materials*, PI: T.R.Schibli (\$43,750)

## Honors, Awards

- [2013-2018] NSF Early Career Award #1253044, *Noise and stability analysis in monolithic mode-locked lasers*, PI: T.R. Schibli (\$400,000)

- [2011-2014] DARPA Young Faculty Award #YFA N66001-11-1-4156, *Monolithic ultrafast solid-state lasers*, PI: T.R.Schibli (\$296,664)
- [2003-2005] JSPS Postdoctoral Fellowship including research funds provided by 'The Japan Society for the Promotion of Science', PI: T.R.Schibli (11,725,000 JPY)
- [2001] Ph.D. thesis 'with excellence' (top 1%) from The University of Karlsruhe (now KIT: Karlsruhe Institute of Technology), Germany.

## Appointments

- [2015-present] Associate Professor at the University of Colorado, Boulder, CO, USA.
- [2014-present] Fellow Adjunct of JILA, Boulder, CO, USA.
- [2011-present] Professor Adjoint, Department of Electrical, Computer, and Energy Engineering (ECEE) at the University of Colorado at Boulder, USA.
- [2008-2015] Assistant Professor at the University of Colorado, Boulder, CO, USA.
- [2008-2014] Member of JILA, Boulder, CO, USA.
- [2006-2008] Senior research associate at JILA/University of Colorado, Boulder CO, USA.
- [2003-2006] Research staff and postdoctoral fellow at the National Institute of Advanced Industrial Science and Technology/National Metrology Institute of Japan, (AIST/NMIJ), Lengths and dimensions division, Tsukuba, Japan.
- [2001-2003] Postdoctoral Associate at the Massachusetts Institute of Technology (MIT), optics and quantum electronics group, Cambridge MA, USA.
- [1999-2001] Ph.D. candidate at University of Karlsruhe, Germany (BAT IIa).
- [1994] Software development at ED&F MAN Management AG, Pfäffikon, Switzerland.

## Professional Activities

- [2016-2017] Member of the program committee of the 6th Advanced Lasers and Photon Sources Conference (ALPS17), Yokohama, Japan.
- [2015-2016] Member of the program committee of the 5th Advanced Lasers and Photon Sources Conference (ALPS16), Yokohama, Japan.
- [2014-2015] General co-Chair of CLEO S&I USA 2015, San Jose, CA, USA.
- [2012-2013] Program co-Chair of CLEO S&I USA 2013, San Jose, CA, USA.
- [2011-2013] Member of the organizing committee of the 2013 CLEO Pacific RIM, Kyoto, Japan.
- [2010-2011] Chair of the Time and Frequency Metrology conference (part of the SPIE International Symposium on SPIE Optical Engineering + Applications)
- [2010-2011] Organizer of the Scientific Seminar on Optical Frequency Metrology at the 2011 URSI General Assembly (2011 URSIGA).
- [2009-2011] Member of the CLEO/QUELS subcommittee on optical metrology.

- [2009] Organizer of a special CLEO symposium on optical frequency combs.
- [2008-2009] Member of the CLEO-Europe subcommittee on ultrafast optics.
- [2007-2009] Chair of CLEO/QUELS subcommittee on optical metrology.
- [2007-present]: Reviewer for funding agencies: NSF, NASA, SNSF (Switzerland), NSERC (Canada), KAIST (Korea) and others.
- [2000-present] Articles refereed for: Nature Photonics, Optics Letters, Optics Express, JOSA B, New Journal of Physics, IEEE PTL, IEEE JQE and others.

## Teaching

1999 - 2001	Instructor for laboratory in optical communication and RF-devices and measurement techniques at the University of Karlsruhe, Germany.
Fall 2008	PHYS 2130: 'Modern Physics for Scientists and Engineers,' at the University of Colorado, Boulder, Colorado.
Spring 2009	PHYS 1110: 'Calculus-based introductory Physics I,' at the University of Colorado, Boulder, Colorado.
Fall 2009	PHYS 3310: 'Upper division E&M for physics majors,' at the University of Colorado, Boulder, Colorado. This course includes a weekly tutorial.
Spring 2010	PHYS 2130: 'Modern Physics for Scientists and Engineers,' at the University of Colorado, Boulder, Colorado.
Fall 2010	Recitations to PHYS1110: 'Calculus-based introductory Physics I,' at the University of Colorado, Boulder, Colorado.
Spring 2011	PHYS 1120: 'Calculus-based Introductory Physics II,' at the University of Colorado, Boulder, Colorado.
Fall 2011	PHYS 2130: 'Modern Physics for Scientists and Engineers,' at the University of Colorado, Boulder, Colorado.
Spring 2012	PHYS 3330: 'Electronics for the physical Sciences,' at the University of Colorado, Boulder, Colorado.
Fall 2012	PHYS 3330: 'Electronics for the physical Sciences,' at the University of Colorado, Boulder, Colorado.
Spring 2014	PHYS 1120: 'Calculus-based Introductory Physics II,' at the University of Colorado, Boulder, Colorado.
Fall 2014	PHYS 1110H: Honors section of 'Calculus-based Introductory Physics I,' at the University of Colorado, Boulder, Colorado.
Spring 2015	PHYS 3310: 'Upper division E&M for physics majors,' at the University of Colorado, Boulder, Colorado.
Fall 2016	PHYS 2150: 'Experimental Physics 2,' at the University of Colorado, Boulder, Colorado.
Spring 2017	PHYS 3310: 'Upper division E&M for physics majors,' at the University of Colorado, Boulder, Colorado.
Fall 2017	PHYS 5160: 'Laser Fundamentals,' at the University of Colorado, Boulder, Colorado.
Spring 2018	PHYS 4420: 'Quantum Mechanics II,' at the University of Colorado, Boulder, Colorado.

## Patent applications

- T. R. Schibli, F. X. Kärtner, U. Morgner, 'Modelocked Laser,' (Az. PCT/EP00/13138 and Az. DE 199 62 047.4). Filed in 1999.
- T. R. Schibli, F. X. Kärtner, W. Seitz, 'Method for controlling the dynamics of laser systems,' (Az. PCT/EP02/08104). Filed in 2000.

- F. X. Kärtner, W. Seitz, U. Morgner, T. R. Schibli, E. R. Thoen, 'Nonlinear Fabry-Perot,' (Az. PCT/EP02/01922 and Az. DE 101 09 084.6). Filed in 2001
- M. E. Fermann, T. R. Schibli, I. Hartl, 'Compact Optical Frequency Comb Systems' (U.S. patent 8,792,525) initial filing in 2012; granted in 2014.
- T. R. Schibli, 'Monolithic Mode-Locked Laser' PCT request filed in January 2017.

## Scientific Articles in Journals and Books

### Reviewed Post-Conference Articles

1. F. X. Kärtner, U. Morgner, R. Ell, Ch. Jirauschek, G. Metzler, T. R. Schibli, Y. Chen, H. A. Haus, E. P. Ippen, J. Fujimoto, V. Scheuer, G. Angelow, T. Tschudi, 'Challenges and Limitations on Generating Few Cycle Laser Pulses directly from Oscillators,' *Ultrafast Phenomena XII*, Springer Series in Chemical Physics, pp. 51-55, (2000).
2. T. R. Schibli, K. E. Robinson, U. Morgner, S. Mohr, D. Kopf, and F. X. Kärtner, 'Control of Q-switching instabilities in passively mode-locked lasers,' *OSA TOPS Vol. 68*, *Advanced Solid-State Lasers*, M. E. Fermann and L. R. Marshall, eds. 2002, Optical Soc. of America (2002).
3. T. R. Schibli, J. Kim, O. Kuzucu, J. T. Gopinath, S. N. Tandon, G. S. Petrich, L. A. Kolodziejski, J. G. Fujimoto, E. P. Ippen, F. X. Kaertner, 'Attosecond active synchronization of passively mode-locked lasers using balanced cross-correlation,' accepted for reprint in *OSA Trends in Optics and Photonics Series (TOPS) on Advanced Solid-State Photonics* (2003).
4. I. Hartl, G. Imeshev, G. C. Cho, M. E. Fermann, T. R. Schibli, K. Minoshima, A. Onae, F.-L. Hong, H. Matsumoto, J. W. Nicolson, M. F. Yan, 'Carrier envelope phase locking of an in-line, low-noise Er fiber system,' *OSA Trends in Optics and Photonics Series (TOPS) 94*, *Advanced Solid-State Photonics*, Gregory J. Quarles, ed. (Optical Society of America, Washington, DC), pp. 176-178 (2004).
5. T.R. Schibli, K. Minoshima, F.-L. Hong, H. Inaba, A. Onae, H. Matsumoto, I. Hartl, M.E. Fermann, 'Frequency Metrology with a Turnkey All-Fiber System,' *Proceedings of the 14th international conference on ultrafast phenomena XIV*, T. Kobayashi, Springer Verlag pp. 843-5 (2005).
6. I. Hartl, L. Dong, M. E. Fermann, T. R. Schibli, A. Onae, F.-L. Hong, H. Inaba, K. Minoshima, H. Matsumoto, 'Fiber Based Frequency Comb Lasers,' *OSA Trends in Optics and Photonics Series (TOPS)*, *Advanced Solid-State Photonics 2005*, Optical Society of America, Washington, DC, (2005).
7. T. R. Schibli, K. Minoshima, H. Kataura, E. Itoga, N. Minami, S. Kazaoui, K. Miyashita, M. Tokumoto, and Y. Sakakibara, 'Carbon nanotube based saturable absorber mirrors and their application to ultrashort pulse-generation,' submitted to the proceedings of the 5th international conference on ultrafast optics, *Springer Series in Optical Sciences*, Springer Verlag, Germany (2005).

8. T. R. Schibli, I. Hartl, D. C. Yost, M. J. Martin, A. Marcinkevicius, M. E. Fermann, and J. Ye, 'High-power, mHz linewidth Yb: fiber optical frequency comb for high harmonic generation,' *Ultrafast Phenomena XVI*, Springer Series in Chemical Physics **92**, Eds. P. Corkum, S. De Silvestri, K. A. Nelson, E. Riedle, R. W. Schoenlein, Springer, ISBN: 978-3-540-95945-8 (2009).

### Peer-reviewed Journal Articles and Books

9. F. X. Kärtner, N. Matuschek, T. Schibli, U. Keller, H. A. Haus, C. Heine, R. Morf, V. Scheuer, M. Tilsch, and T. Tschudi, 'Design and fabrication of double-chirped mirrors,' *Optics Letters* **22**, pp. 831-833 (1997).
10. E. R. Thoen, E. M. Koontz, M. Joschko, P. Langlois, T. R. Schibli, F. X. Kärtner, E. P. Ippen, and L. A. Kolodiejski: 'Two-photon absorption in semiconductor saturable absorber mirrors,' *Applied Phys. Lett.* **74**, 26, pp. 3927-3929 (1999).
11. T. R. Schibli, E. R. Thoen, F. X. Kärtner, and E. P. Ippen, 'Suppression of Q-switched modelocking and break-up into multiple pulses by inverse saturable absorption,' *Appl. Phys. B* **70**(Suppl.), S41-S49 (2000).
12. F. X. Kärtner, U. Morgner, R. Ell, T. R. Schibli, J. G. Fujimoto, E. P. Ippen, V. Scheuer, G. Angelow, and T. Tschudi, 'Ultrabroadband Double-Chirped Mirror Pairs for Octave Spectrum Generation,' *Journal of the Optical Society of America B*, **18** pp. 882-885 (2001).
13. T. R. Schibli, U. Morgner, and F. X. Kärtner, 'Control of Q-switched mode locking by active feedback,' *Optics Letters* **26**, 3, pp. 148ff (2001).
14. U. Morgner, R. Ell, G. Metzler, T. R. Schibli, F. X. Kärtner, J. G. Fujimoto, H. A. Haus, and E. P. Ippen, 'Nonlinear optics with phase-controlled pulses in the sub-two-cycle regime,' *Physical Review Letters*, **86**, 5462-5465, (2001).
15. T. R. Schibli, T. Kremp, U. Morgner, F. X. Kärtner, R. Butendeich, J. Schwarz, H. Schweizer, F. Scholz, J. Hetzler, and M. Wegener, 'CW operation and Q-switched mode-locking of Cr<sup>4+</sup>:YAG micro-chip lasers,' *Optics Letters* **26**, 12, pp. 941ff (2001).
16. W. Seitz, T. R. Schibli, U. Morgner, F. X. Kärtner, C. H. Lange, W. Richter, and B. Braun, 'Passive Synchronization of two Independent Laser Oscillators with a Fabry-Perot-Modulator,' *Optics Letters* **27**, pp. 454ff (2002).
17. A. M. Kowalevich, Jr., T. R. Schibli, F. X. Kärtner, and J. G. Fujimoto, 'Ultralow-threshold Kerr-lens mode-locked Ti:Al<sub>2</sub>O<sub>3</sub> lasers,' *Opt. Lett.* **27**, pp. 1-3 (2002).
18. W. Seitz, R. Ell, U. Morgner, T. R. Schibli, F. X. Kärtner, M. J. Lederer, and B. Braun, 'All-optical Active Mode-locking with a Nonlinear Semiconductor Modulator,' *Optics Letters* **27**, pp. 2209ff (2002).
19. P. C. Wagenblast, U. Morgner, F. Grawert, T. R. Schibli, F. X. Kaertner, V. Scheuer, G. Angelow, M. J. Lederer, 'Generation of sub-10-fs pulses from a Kerr-lens mode-locked Cr<sup>3+</sup>:LiCAF laser oscillator by use of third-order dispersion-compensating double-chirped mirrors,' *Opt. Lett.* **27**, 1726-1728 (2002).
20. R. Ell, W. Seitz, U. Morgner, T. R. Schibli and F. X. Kärtner, 'Carrier-envelope phase dynamics of synchronized mode-locked lasers,' *Optics Communications*, Volume 220, Issues 1-3, pp. 211-214 (2003).

21. T. R. Schibli, J. Kim, O. Kuzucu, J. T. Gopinath, S. N. Tandon, G. S. Petrich, L. A. Kolodziejski, J. G. Fujimoto, E. P. Ippen, F. X. Kaertner, 'Attosecond active synchronization of passively mode-locked lasers using balanced cross-correlation,' *Optics Letters*, **28**, 947-949 (2003).
22. T. R. Schibli, O. Kuzucu, J. Kim, E. P. Ippen, J. G. Fujimoto, F. X. Kaertner, V. Scheuer, G. Angelow, 'Towards Single-Cycle Lasersystems,' *IEEE Journal of Selected Topics in Quantum Electronics*, **9**, 4, pp. 990-1001 (2003). (invited)
23. F.-L. Hong, A. Onae, J. Jiang, R. Guo, H. Inaba, K. Minoshima, T. R. Schibli, H. Matsumoto, K. Nakagawa, 'Absolute frequency measurement of an acetylene-stabilized laser at 1542 nm,' *Optics Letters*, **28**, 2324-2326 (2003).
24. F.X. Kaertner, U. Morgner, T. Schibli, R. Ell, H.A. Haus, J.G. Fujimoto, E.P. Ippen, 'Few-cycle pulses directly from a laser,' *Topic. in Appl. Phys.* **95**, 73-135 (2004)
25. H. Inaba, T. Ikegami, F.-L. Hong, A. Onae, Y. Koga, T. R. Schibli, K. Minoshima, H. Matsumoto, S. Yamadori, O. Tohyama, S.-I. Yamaguchi, 'Phase locking of a continuous-wave optical parametric oscillator to an optical frequency comb for optical frequency synthesis,' *IEEE Journal of Quantum Electronics* **40**, 929- 936 (2004).
26. L. Matos, D. Kleppner, O. Kuzucu, T. R. Schibli, J. Kim, E. P. Ippen, F. X. Kaertner, 'Direct frequency comb generation from an octave-spanning, prismless Ti:sapphire laser,' *Optics Letters*, **29**, 1683-1685 (2004).
27. T. R. Schibli, K. Minoshima, F.-L. Hong, H. Inaba, A. Onae, H. Matsumoto, I. Hartl, M. E. Fermann, 'Frequency metrology with a turnkey all-fiber system,' *Optics Letters* **29**, 2467-9 (2004).
28. T. R. Schibli, K. Minoshima, F.-L. Hong, H. Inaba, Y. Bitou, A. Onae, H. Matsumoto, 'Phase-locked widely tunable optical single-frequency generator based on a femtosecond comb,' *Optics Letters*, **30**, 2323-5 (2005).
29. T. R. Schibli, K. Minoshima, H. Katura, E. Itoga, N. Minami, S. Kazaoui, K. Miyashita, M. Tokumoto, Y. Sakakibara, 'Ultrashort pulse-generation by saturable absorber mirrors based on polymer-embedded carbon nanotubes,' *Optics Express*, **13**, pp.8025-31 (2005).
30. H. Inaba, T. Ikegami, F.-L. Hong, Y. Bitou, A. Onae, T. R. Schibli, K. Minoshima, H. Matsumoto, 'Doppler-free spectroscopy using continuous-wave optical frequency synthesizer,' *Appl. Opt.* **45**, 4910-4915 (2006).
31. H. Inaba, Y. Daimon, F. -L. Hong, A. Onae, K. Minoshima, T. R. Schibli, H. Matsumoto, M. Hirano, T. Okuno, M. Onishi, and M. Nakazawa, 'Long-term measurement of optical frequencies using a simple, robust and low-noise fiber based frequency comb,' *Opt. Express* **14**, 5223-5231 (2006).
32. Y. Bitou, T. R. Schibli, K. Minoshima, 'Accurate wide-range displacement measurement using tunable diode laser and optical frequency comb generator,' *Optics Express*, **14**, pp.644-654 (2006).
33. T. R. Schibli, K. Minoshima, Y. Bitou, F.-L. Hong, H. Inaba, A. Onae, H. Matsumoto, 'Displacement metrology with sub-pm resolution in air based on a fs-comb wavelength synthesizer,' *Optics Express* **14**, 5984-5993 (2006).

34. C. R. Menyuk, J. K. Wahlstrand, J. Willits, R. P. Smith, T. R. Schibli, and S. T. Cundiff, 'Pulse dynamics in mode-locked lasers: relaxation oscillations and frequency pulling,' *Opt. Express* **15**, 6677-6689 (2007).
35. I. Hartl, T. R. Schibli, A. Marcinkevicius, D. C. Yost, D. D. Hudson, M. E. Fermann, and J. Ye, 'Cavity-enhanced similariton Yb-fiber laser frequency comb:  $3 \cdot 10^{14}$  W/cm<sup>2</sup> peak intensity at 136 MHz,' *Opt. Lett.* **32**, 2870-2872 (2007).
36. K. Minoshima, T. R. Schibli, H. Inaba, Y. Bitou, F.-L. Hong, A. Onae, and H. Matsumoto, 'Precision length metrology based on the time and frequency standards using optical combs,' *The Review of Laser Engineering*, **35**, 642-648, The Laser Society of Japan (2007).
37. J. K. Wahlstrand, J. T. Willits, T. R. Schibli, C. R. Menyuk, and S. T. Cundiff, 'Quantitative measurement of timing and phase dynamics in a mode-locked laser,' *Opt. Lett.* **32**, 3426-3428 (2007).
38. E. E. Eyler, D. E. Chieda, M. C. Stowe, M. J. Thorpe, T. R. Schibli, J. Ye, 'Prospects for precision measurements of atomic helium using direct frequency comb spectroscopy,' *Eur. Phys. J. D* **48**, 43-55 (2008).
39. T. R. Schibli, D. C. Yost, M. J. Martin, J. Ye, I. Hartl, A. Marcinkevicius, and M. E. Fermann, 'Optical frequency comb with sub-mHz linewidth and >10 W average power,' *Nature Photonics* **2**, 355 - 359 (2008).
40. D. C. Yost, T. R. Schibli, J. Ye, 'Novel geometry for efficient output coupling of intracavity high harmonic generation,' *Opt. Lett.* **33**, 1099-1101 (2008).
41. D. D. Hudson, K. Shish, T. R. Schibli, J. N. Kutz, D. Christodoulides, R. Morandotti, S. T. Cundiff, 'Nonlinear Femtosecond Pulse Reshaping in Waveguide Arrays,' *Opt. Lett.* **33**, 1440-1442 (2008).
42. T. R. Schibli, 'Combs for dark energy,' *Nature Photonics* **2**, 712-713 (2008). (invited)
43. T. R. Schibli, 'Clever calibration,' *Nature Photonics* **3**, 491-492 (2009). (invited)
44. M. J. Martin, S. M. Foreman, T. R. Schibli, and J. Ye, 'Testing Ultrafast Mode-Locking at Microhertz Relative Optical Linewidth,' *Opt. Expr.* **17**, 558568 (2009).
45. D. C. Yost, T. R. Schibli, J. Ye, J. L. Tate, J. Hostetter, M. B. Gaarde, K. J. Schafer, 'Vacuum ultraviolet frequency combs from below-threshold harmonics,' *Nature Physics* **5**, 815-820 (2009). (cover story)
46. T. C. Briles, D. C. Yost, A. Cingz, J. Ye, T. R. Schibli, 'Simple piezoelectric-actuated mirror with 180 kHz servo bandwidth,' *Opt. Express* **18**, 9739-9746 (2010).
47. C.-C. Lee, G. Acosta, J. S. Bunch, T. R. Schibli, 'Ultra-Short Optical Pulse Generation With Single Layer Graphene,' *Journal of Nonlinear Optical Physics & Materials (JNOPM)* **19**, 767-771 (2010).
48. D. D. Hudson, J. N. Kutz, T. R. Schibli, D. N. Christodoulides, R. Morandotti, and S. T. Cundiff, 'Spatial distribution clamping of discrete spatial solitons due to three photon absorption in AlGaAs waveguide arrays,' *Optics Express* **20**, 1939-1944 (2012).
49. C.-C. Lee, J. M. Miller, and T. R. Schibli, 'Doping-induced changes in the saturable absorption of monolayer graphene,' *Applied Physics B* **108**, 129-135 (2012).

50. C.-C. Lee, S. Suzuki, W. Xie, and T. R. Schibli, 'Broadband graphene electro-optic modulators with sub-wavelength thickness,' *Optics Express*, **20**, 5264-5269 (2012).
51. D. D. Hudson, J. N. Kutz, T. R. Schibli, Q. Chao, D. N. Christodoulides, R. Morandotti, and S. T. Cundiff, 'Fixed point attractor for chirp in nonlinear waveguide arrays,' *Physical Review A* **85**, 031806(R) (2012).
52. C.-C. Lee, I. Hartl, C. Mohr, J. Bethge, S. Suzuki, M.E. Fermann, and T. R. Schibli, 'Frequency comb stabilization with bandwidth beyond the limit of gain lifetime by an intra-cavity graphene electro-optic modulator,' *Optics Letters* **37**, 3084-3086 (2012).
53. Seiya Suzuki, Chien-Chung Lee, Takashi Nagamori, Thomas R. Schibli, and Masamichi Yoshimura, 'Nondegradative Dielectric Coating on Graphene by Thermal Evaporation of SiO,' *Jpn. J. Appl. Phys.* **52**, 125102 (2013).
54. C.-C. Lee, T. R. Schibli, 'Intrinsic Power Oscillations Generated by the Backaction of Continuum on Solitons and its Implications on the Transfer Functions of a Mode-Locked Laser,' *PRL* **112**, 223903 (2014).
55. D. Hou, C.-C. Lee, Z. Yang and T. R. Schibli, 'Timing jitter characterization of mode-locked lasers with  $<1 \text{ zs}/\sqrt{\text{Hz}}$  resolution using a simple optical heterodyne technique,' *Opt. Lett.* **40**, 2985-8 (2015).
56. N. Kuse, C.-C. Lee, J. Jiang, C. Mohr, T. R. Schibli, & M.E. Fermann, 'Ultra-low noise all polarization-maintaining Er fiber-based optical frequency combs facilitated with a graphene modulator,' *Opt. Exp.* **23**, 24342-50 (2015).
57. C.-C. Lee, Y. Hayashi, K. L. Silverman, A. Feldman, T. Harvey, R. P. Mirin. T. R. Schibli, 'Monolithic device for modelocking and stabilization of frequency combs,' *Opt. Exp.* **23**, 33038-43 (2015).
58. N. Kuse, J. Jiang, C.-C. Lee, T. R. Schibli, M. E. Fermann, 'All polarization-maintaining Er fiber-based optical frequency combs with nonlinear amplifying loop mirror,' *Opt. Exp.* **24**, 3095-3102, (2016).
59. Naoya Kuse, Thomas R. Schibli, Martin E. Fermann, 'Low noise electro-optic comb generation by fully stabilizing to a mode-locked fiber comb,' *Opt. Exp.* **24**, 16884-93 (2016).
60. Tyko D. Shoji, Wanyan Xie, Kevin L. Silverman, Ari Feldman, Todd Harvey, Richard P. Mirin, Thomas R. Schibli, 'Ultra-low-noise monolithic mode-locked solid-state laser,' *Optica* **3**, 995-8 (2016).
61. Kevin F. Lee, Grzegorz Kowzan, C.-C. Lee, C. Mohr, Jie Jiang, Peter G. Schunemann, T. R. Schibli, Piotr Maslowski, M. E. Fermann, 'Frequency combs for cavity cascades: OPO combs and graphene-coupled cavities,' *J. Phys. B*, **50**, 014003 (2017).
62. C. Wan, T. R. Schibli, P. Li, C. Bevilacqua, A. Ruehl, and I. Hartl, 'Intensity noise coupling in soliton fiber oscillators,' *Opt. Lett.* **42**, pp. 5266-9 (2017).
63. M. Endo, T. D. Shoji, and T.s R. Schibli, 'Ultra-low noise optical frequency combs,' submitted to *IEEE JSTQE* (2018). (invited)
64. M. Endo, T. D. Shoji, and T. R. Schibli, 'High-sensitivity optical to microwave comparison with dual-output Mach-Zehnder modulators,' submitted to *Nature Communications* (2018).



## Talks and Presentations

### Invited talks, seminars, and guest lectures

1. U. Morgner, R. Ell, G. Metzler, T. R. Schibli, F. X. Kaertner, J. G. Fujimoto, E. P. Ippen, 'Nonlinear optics with phase-controlled pulses in the sub-two cycle regime, Paper QFC, Quantum Electronics and Laser Science Conference (QUELS 2001), Baltimore, USA (2001).
2. F. X. Kaertner, T. R. Schibli, O. Kuzucu, J. Kim, L. Matos, J. G. Fujimoto and E. P. Ippen, 'Towards Single-Cycle Optical Pulses,' Paper MJ2, OSA Annual Meeting, Tucson Arizona, USA (2003).
3. T. R. Schibli, 'Active Control of Ultrafast Lasers,' Seminar at the National Metrology Institute of Japan (NMIJ/AIST), Tsukuba, Japan, April (2003).
4. T. R. Schibli, 'Active Control of Ultrafast Lasers, Part I and Part II,' two lectures at the Tokyo University, Hongo campus, group of Prof. T. Kobayashi, Tokyo Japan, July (2003).
5. Ingmar Hartl, L. Dong, M. E. Fermann, T. R. Schibli, A. Onae, F. L. Hong, H. Inaba, K. Minoshima, H. Matsumoto, 'Fiber Based Frequency Comb Lasers and Their Applications,' Paper WE4, Advanced Solid-State Photonics (ASSP), Vienna, Austria (2005).
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17. T. R. Schibli, 'Graphene: Cutting-edge research on an everyday material,' Lecture as part of the Science Discovery series on Nanotechnology at the University of Colorado (2011).
18. T. R. Schibli, 'Ultrafast Graphene Optoelectronics,' CNL/NNIN Workshop on Graphene, October 7 (2011).
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21. T. R. Schibli, 'Optical and electronic properties of graphene,' National Nanoinfrastructure Network (NNIN) seminar at the Colorado Nanofabrication Laboratory (CNL), July (2013).
22. T. R. Schibli, 'Ultrafast optics with Graphene,' Ultrafast Optics Conference, Davos Congress Centre, Switzerland, March 2-8 (2013).
23. T. R. Schibli, 'Graphene devices for ultra-low noise optical frequency combs,' The 3rd Advanced Lasers and Photon Sources Conference (ALPS'14), Yokohama, Japan (2014).
24. T. R. Schibli, 'Frequency combs at the fundamental limit,' Seminar Talk at the University of Electrocommunication, Chofu, Tokyo, Japan, April 25, 2014.
25. C.C. Lee, T. R. Schibli, 'Frequency Combs at the Fundamental Limit using Graphene Modulators,' Advanced Solid State Lasers, Shanghai, China, November 16-21 (2014).
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28. Thomas R. Schibli, 'An Ultra-low Noise Monolithic Mode-Locked Laser,' ERATO seminar, University of Electro-Communication (UEC), Chofu, Japan, July 26 (2016).
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