Theodore Peter Letsou

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Education

2021–2026 **Ph.D., Electrical Engineering**, Massachusetts Institute of Technology
Supervisor: Federico Capasso
Ph.D. Thesis: "Active Mid-Infrared Integrated Photonics"

2019–2021 **S.M., Electrical Engineering**, Massachusetts Institute of Technology
Supervisor: Qing Hu
Masters Thesis: "Mid-Infrared Frequency Combs based on Quantum Cascade Lasers"

2015–2019 **B.S.E., Engineering Physics**, *summa cum laude*, *4.0/4.0*, Case Western Reserve University
Supervisor: Giuseppe Strangi
Senior Thesis: "Low-Loss, Epsilon-Near-Zero (ENZ) Metamaterials to Alter the Spontaneous Emission (SE) Rate of Quantum Emitters"

Appointments

2025– Postdoctoral Fellow of Applied Physics, Harvard John A. Paulson School of Engineering and Applied Sciences

2021–2025 Fellow of Applied Physics, Harvard John A. Paulson School of Engineering and Applied Sciences

2019–2021 Research Assistant, Research Lab of Electronics, Massachusetts Institute of Technology

2016–2019 Undergraduate Research Assistant, Department of Physics, Case Western Reserve University

Honors and Awards

2021 DoD NDSEG fellowship recipient

2021 NSF Graduate Research Fellowship (GRFP) recipient

2019 Elmer C. Stewart Award for outstanding senior in Engineering Physics

2018 Donald E. Schuele Award for outstanding junior majoring in Engineering

2018 Outstanding Junior Award of the Case School of Engineering

2017 Outstanding Sophomore Award of the Case School of Engineering

2017 Tau Beta Pi member

Publications

Journals and Preprints

* *indicates shared first authorship*

[1] D. Kazakov*, **T. P. Letsou***, N. Opačak*, B. Schwarz, F. Capasso “A Parametric gain laser,” *Under Preparation*, **2026**.

[2] **T. P. Letsou***, J. Fuchsberger*, N. Opačak, D. Kazakov, P. Chevalier, B. Schwarz, F. Capasso “High-power ring laser frequency-modulated combs,” *Optica* **13**(3), 533–540, **2026**, DOI: 10.1364/OPTICA.582100

[3] M. G. Donato*, M. Hinczewski*, **T. P. Letsou**, M. ElKabbash, R. Saija, P. G. Gucciardi, N. Engheta, G. Strangi, O. M. Marago, “Observation of Light-Driven Levitation Near Epsilon-Near-Zero Surfaces,” *arXiv*, **2026**, DOI: 10.48550/arXiv.2601.10425

[4] J. Fuchsberger*, **T. P. Letsou***, D. Kazakov, R. Szedlak, F. Capasso, B. Schwarz “Continuously and widely tunable semiconductor ring lasers,” *Optica* **12**(7), 985–990, **2025**, DOI: 10.1364/OPTICA.559884

[5] S. K. Sanders, C. T. Kuhs, **T. P. Letsou**, H. O. Everitt, “How clearly can an infrared detector see through a hot window?,” *Applied Physics Letters* **127**(4), 041104 (2025). DOI: 10.1063/5.0266983

[6] D. Kazakov*, **T. P. Letsou***, M. Piccardo, L. L. Columbo, M. Brambilla, F. Prati, S. Dal. Cin, M. Beiser, N. Opačak, M. Pushkarsky, D. Caffey, T. Day, L. A. Lugiato, B. Schwarz, F. Capasso “Driven bright solitons on a mid-infrared laser chip,” *Nature* **641**, 83-89, **2025**, DOI: 10.1038/s41586-025-08853-y

[7] **T. P. Letsou**, D. Kazakov, M. Piccardo, P. Ratra, L. L. Columbo, M. Brambilla, F. Prati, C. Rimoldi, S. Dal. Cin, N. Opačak, H. O. Everitt, B. Schwarz, F. Capasso “Hybridized Soliton Lasing in Coupled Semiconductor Lasers,” *Phys. Rev. Lett.* **134**, 023802, **2025**, DOI: 10.1103/PhysRevLett.134.023802

[8] N. Opačak, D. Kazakov, L. L. Columbo, M. Beiser, **T. P. Letsou**, F. Pilat, M. Brambilla, F. Prati, M. Piccardo, F. Capasso, B. Schwarz “Nozaki–Bekki solitons in semiconductor lasers,” *Nature*, **2024**, DOI: 10.1038/s41586-023-06915-7

[9] D. Kazakov, **T. P. Letsou**, M. Beiser, Y. Zhi, N. Opačak, M. Piccardo, B. Schwarz, F. Capasso “Active mid-infrared ring resonators,” *Nat. Commun.*, **2024**, DOI: 10.1038/s41467-023-44628-7

[10] M. ElKabbash, N. Hoffman, A. R. Lininger, S. A. Jalil, **T. P. Letsou**, M. Hinczewski, G. Strangi, C. Guo, “Fano Resonant Optical coatings platform for Full Gamut and High Purity Structural Colors,” *Nat. Commun.*, **2023**, DOI: 10.1038/s41467-023-39602-2

[11] Y. Kiasat, M. G. Donato, M. Hinczewski, M. ElKabbash, **T. P. Letsou**, R. Saija, O. M. Marago, G. Strangi, N. Engheta, “Epsilon-near-zero (ENZ)-based Optomechanics,” *Communications Physics* **6**, 69 (2023). DOI: 10.1038/s42005-023-01186-0

[12] M. ElKabbash, **T. P. Letsou**, S. A. Jalil, N. Hoffman, J. Zhang, J. Rutledge, C. H. Fann, M. Hinczewski, G. Strangi, C. Guo, “Fano resonant ultrathin film optical coatings,” *Nat. Nanotechnol.*, **2021**, DOI: 10.1038/s41565-020-00841-9

[13] M. ElKabbash, K.V. Sreekanth, A. Fraiwan, J. Cole, Y. Alapan, **T. P. Letsou**, N. Hoffman, C. Guo, M. Sankaran, U. Gurkan, M. Hinczewski, G. Strangi, “Ultrathin-film optical coating for angle independent remote hydrogen sensing,” *Meas. Sci. Technol.*, **2020**, 31, 115201. DOI: 10.1088/1361-6501/ab9fd8

[14] M. ElKabbash, K.V. Sreekanth, J. Cole, M. Kim, Y. Alapan, A. Fraiwan, Y. Li, **T. P. Letsou**, M. Sankaran, U. Gurkan, M. Hinczewski, G. Strangi, "Hydrogen Sensing Using Thin-Film Perfect Light Absorber," *ACS Photonics*, **2019**, 6(8), 1889-1894. DOI: 10.1021/acsphotonics.9b00764

[15] K. V. Sreekanth, M. ElKabbash, R. Medwal, J. Zhang, **T. P. Letsou**, G. Strangi, M. Hinczewski, R. S. Rawat, C. Guo, R. Singh, "Experimental Realization of Non-Magnetic Generalized Brewster-Angle Effect in Thin-Film Optical Absorbers and its Application for Hydrogen Sensing," *ACS Photonics*, **2019**, 6(7), 1610-1617. DOI: 10.1021/acsphotonics.9b00564

[16] **T. P. Letsou**, M. ElKabbash, S. Iram, M. Hinczewski, and G. Strangi, "Heat-induced perfect light absorption in thin-film metasurfaces for structural coloring [invited]," *Opt. Mater. Express.* **2019**, 9(3), 1386-1393. DOI: 10.1364/OME.9.001386

[17] M. ElKabbash, S. Iram, **T. P. Letsou**, M. Hinczewski, and G. Strangi, "Designer Perfect Light Absorption Using Ultrathin Lossless Dielectrics on Absorptive Substrates," *Adv. Optical Mater.* **2018**, 1800672. DOI: 10.1002/adom.201800672

[18] M. ElKabbash, E. Ilker, **T. P. Letsou**, N. Hoffman, A. Yaney, M. Hinczewski, and G. Strangi, "Iridescence-Free and Narrowband Perfect Light Absorption in Critically Coupled Metal High-Index Dielectric Cavities," *Opt. Lett.* **2017**, 42(18), 3598-3601. DOI: 10.1364/OL.42.003598

Presentations Given

** indicates invited*

[1] **T. P. Letsou***, D. Kazakov, J. Fuchsberger, N. Opačak, P. Ratra, S. Dal Cin, M. Beiser, L. Columbo, M. Brambilla, F. Prati, C. Rimoldi, L. Lugiato, S. Slivken, M. Pushkarsky, D. Caffey, T. Day, M. Piccardo, B. Schwarz, and F. Capasso, "Active mid-infrared integrated photonics," in *Proc. SPIE 13908, Quantum Sensing and Nano Electronics and Photonics XXIII* (SPIE, San Francisco, CA, USA, 22 Jan. 2026); paper 13908-85. **2026**. DOI: 10.1117/12.3100942

[2] **T. P. Letsou**, D. Kazakov, M. Piccardo, L. Columbo, M. Brambilla, F. Prati, J. Fuchsberger, P. Ratra, S. Dal Cin, N. Opačak, L. A. Lugiato, S. Slivken, T. Earles, M. Pushkarsky, T. Day, B. Schwarz, and F. Capasso, "New laser architectures enabled by an active mid-infrared integrated photonics platform," in *CLEO 2025, Technical Digest Series* (Optica Publishing Group, Long Beach, CA, USA, 4–9 May 2025); paper SS173_2. ISBN 978-1-957171-50-0, **2025**. DOI: 10.1364/CLEO_SI.2025.SS173_2

[3] **T. P. Letsou***, D. Kazakov, M. Piccardo, P. Ratra, L. L. Columbo, M. Brambilla, F. Prati, C. Rimoldi, S. Dal Cin, M. Beiser, J. Fuchsberger, N. Opačak, H. O. Everitt, M. Pushkarsky, D. Caffey, T. Day, B. Schwarz, and F. Capasso, "Integrated soliton photonics in the mid-infrared," in *Proc. SPIE 13385, Novel In-Plane Semiconductor Lasers XXIV*, (SPIE, San Francisco, CA, USA, 27–30 Jan. 2025); Art. ID PC133850F. ISBN 978-1-5106-8518-5, **2025**. DOI: 10.1117/12.3040903

[4] **T. P. Letsou***, D. Kazakov, M. Piccardo, L. L. Columbo, M. Brambilla, F. Prati, S. Dal Cin, M. Beiser, N. Opačak, P. Ratra, M. Pushkarsky, D. Caffey, T. Day, L. A. Lugiato, B. Schwarz, and F. Capasso, "Solitons in active nonlinear integrated photonics," in *The International Quantum Cascade Lasers School and Workshop 2024*. **2024**.

[5] D. Kazakov*, **T. P. Letsou**, M. Piccardo, L. L. Columbo, M. Brambilla, F. Prati, P. Ratra, S. Dal Cin, M. Beiser, N. Opačak, L. A. Lugiato, M. Pushkarsky, D. Caffey, T. Day, B. Schwarz, and F. Capasso, "Active nonlinear

mid-infrared photonics," in *CLEO 2024, Technical Digest Series* (Optica Publishing Group, Charlotte, NC, USA, 5–10 May 2024); paper SM4N.5. ISBN 978-1-957171-39-5, **2024**. DOI: 10.1364/CLEO_SI.2024.SM4N.5

[6] **T. P. Letsou**, D. Kazakov, P. Ratra, L. L. Columbo, S. Dal Cin, N. Opačak, M. Piccardo, B. Schwarz, and F. Capasso, "Bright–dark solitons in a hybridized frequency comb," in *Proc. SPIE 12905, Novel In-Plane Semiconductor Lasers XXIII* (SPIE, San Francisco, CA, USA, 27 Jan.–1 Feb. 2024); Art. ID PC1290509. ISBN 978-1-5106-7816-3, **2024**. DOI: 10.1117/12.3016806

[7] **T. P. Letsou**, D. Kazakov, M. Piccardo, L. L. Columbo, M. Brambilla, F. Prati, S. Dal Cin, M. Beiser, N. Opačak, M. Pushkarsky, D. Caffey, T. Day, L. A. Lugiato, B. Schwarz, and F. Capasso, "Temporal solitons in coherently driven ring lasers," in *16th International Conference on Mid-Infrared Optoelectronics: Materials and Devices (MIOMD 2023)*. **2023**.

[8] **T. P. Letsou**, D. Kazakov, M. Piccardo, N. Opačak, M. Beiser, S. Dal Cin, B. Schwarz, and F. Capasso, "Active photonic molecules based on ring quantum cascade lasers," in *CLEO 2023, Technical Digest Series*. **2023**. DOI: 10.1364/CLEO_SI.2023.SF2Q.6

References

- **Professor Federico Capasso**, Applied Physics Department, Harvard John A. Paulson School of Engineering and Applied Sciences, capasso@seas.harvard.edu
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- **Professor Henry O. Everitt**, DEVCOM Army Research Laboratory South, henry.o.everitt.civ@army.mil
- **Professor Giuseppe Strangi**, Physics Department, Case Western Reserve University, gxs284@case.edu
- **Professor Mohamed ElKabbash**, College of Optical Sciences, The University of Arizona, melkabbash@optics.arizona.edu