

# Lukasz Antoni Sterczewski, Ph.D.

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🌐 Personal website: <https://sterczewski.com/>

## Current address:

Wroclaw University of Science and Technology,  
Faculty of Electronics, Photonics  
and Microsystems,  
Wybrzeze Wyspianskiego 27,  
50-370, Wroclaw, Poland

Professional  
experience:

- ▶ **Wroclaw University of Science and Technology, Faculty of Electronics, Photonics, and Microsystems** Wroclaw, Poland, EU  
2/26/2021 – now  
[Assistant Professor / Principal Investigator of ERC Starting Grant \(TeraERC\)](#)  
WORK ON: Semiconductor laser frequency combs, THz wave generation and detection
  
- ▶ **California Institute of Technology, Division of Chemistry and Chemical Engineering** Pasadena CA, USA  
9/1/2020 – 2/25/2021 in lab  
Remote collaboration until now  
[Visiting Researcher / Guest](#)  
WORK ON: Cavity-enhanced optical sensing using interband cascade laser (ICL) frequency combs in prof. Mitchio Okumura's group.
  
- ▶ **NASA Jet Propulsion Laboratory, California Institute of Technology, Microdevices Laboratory** Pasadena CA, USA  
02/25/2019 – 02/24/2021  
[NASA Postdoctoral Program \(NPP\) Research Fellow](#)  
WORK ON: Dual-comb spectroscopy using interband cascade laser frequency combs for space applications.
  
- ▶ **Wroclaw University of Science and Technology, Faculty of Electronics** Wroclaw, Poland, EU  
9/1/2018 – 2/22/2019  
[Postdoctoral Researcher](#)  
WORK ON: Free-running dual-comb spectroscopy with novel light sources.
  
- ▶ **Princeton University, Department of Electrical Engineering** Princeton NJ, USA  
10/1/2015 – 3/31/2018  
[Visiting Graduate Student](#) in Prof. Gerard Wysocki's Laser Sensing Group (PULSE)  
WORK ON: Quantum-cascade and interband-cascade laser-based dual-comb spectroscopy in the mid-infrared and terahertz region; teaching assistance in *Selected Topics in Optics and Optical Electronics* classes.
  
- ▶ **NASA Jet Propulsion Laboratory, California Institute of Technology, Microdevices Laboratory** Pasadena CA, USA  
6/5/2017 – 8/25/2017  
[Graduate Research Fellow](#) under the supervision of Dr. Mahmood Bagheri  
WORK ON: Passively mode-locked ICL frequency combs, device microfabrication.
  
- ▶ **Wroclaw University of Science and Technology, Faculty of Electronics** Wroclaw, Poland, EU  
10/1/2014 – 7/11/2018  
[Graduate Research Assistant](#) under supervision of prof. Edward Plinski  
WORK ON: Novel signal processing and optoelectronic solutions for THz spectroscopy; teaching assistance (*Electricity and Magnetism, Introduction to Programming*).

Professional experience outside academia	<p>► <b>Gromowladcy – freelancer</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <b>Constructor of high voltage devices and science populariser</b> <span style="float: right;">Occasional between 2012-2014</span>            DUTIES: Organization of commercial and non-profit high voltage musical Tesla coil shows, electronic design, CCTV installation.</p>
	<p>► <b>Diehl Controls, Sp. z o.o.</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <b>Hardware engineer in the R&amp;D department</b> <span style="float: right;">6/1/2013 – 8/31/2013</span>            DUTIES: Electronic design, assembly and measurements of prototype boards, worst-case analysis, preparation of test reports.</p>
	<p>► <b>Jadan Automatyka Przemyslowa</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <b>Summer trainee</b> <span style="float: right;">7/1/2012 – 7/31/2012</span>            DUTIES: Maintenance of power circuits, PLC programming, machine shop practice, wiring of control cabinets, and repair of industrial frequency converters.</p>
Education	<p>► <b>Wroclaw University of Science and Technology, Faculty of Electronics</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <span style="float: right;">10/1/2014 – 7/11/2018</span>  <b>PhD studies in Telecommunications</b>            Dissertation: "<i>Signal processing in terahertz and mid-infrared spectroscopy with frequency combs</i>" (defended with distinction), Final public defense: 10/07/2017. Supervisors: prof. Edward Plinski (WUST) &amp; prof. Gerard Wysocki (Princeton University).</p>
	<p>► <b>Princeton University, Department of Electrical Engineering</b> <span style="float: right;">Princeton NJ, USA</span>  <span style="float: right;">10/1/2015 – 3/31/2018</span>  <b>Visiting graduate student (non-degree)</b>            Graduate research on chip-scale optical frequency combs. Ph.D. thesis defended at WUST was supervised by prof. Gerard Wysocki.</p>
	<p>► <b>Wroclaw University of Science and Technology, Faculty of Electronics</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <span style="float: right;">2/1/2013 – 7/17/2014</span>  <b>Master of Science studies in Electronics</b>            Specialty: Advanced Applied Electronics (Studies in English).</p>
	<p>► <b>Wroclaw University of Science and Technology, Faculty of Electronics</b> <span style="float: right;">Wroclaw, Poland, EU</span>  <span style="float: right;">10/1/2009 – 1/22/2013</span>  <b>Bachelor's degree studies (undergraduate) in Control Engineering and Robotics</b>            Specialty: Computerised Control Networks</p>

## Publications:

### Pre-prints submitted to peer-reviewed journals

1. J. Mnich, J. Kunsch, M. Budden, T. Gebert, M. Schossig, J. Sotor, and L. A. Sterczewski, "Ultra-broadband room-temperature Fourier transform spectrometer with watt-level power consumption", arXiv 2409.01875 (2024). ([pdf](#)) ([arXiv](#)) ([dataset](#))

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1. T.-L. Chen; C. Markus, D. Ober, [L. Sterczewski](#), Y.-J. Huang, M. Lisano, C. Canedy, I. Vurgaftman, C. Frez, J. Meyer, M. Bagheri, and M. Okumura, "Direct Frequency Comb Cavity Ring-Down Spectroscopy using Vernier Filtering", submitted to the *Journal of Physical Chemistry* (2024).
  3. [L. A. Sterczewski](#), J. Mnich, and J. Sotor, "Broadband THz wave generation and detection in organic crystal PNPA at MHz repetition rates," arXiv 2407.20745 (2024). ([pdf](#)) ([arXiv](#)) ([dataset](#))

## Peer-reviewed journal articles

1. [L. A. Sterczewski](#), and M. Bagheri, "Sub-nominal Resolution Fourier Transform Spectrometry with Chip-Based Combs," *Laser & Photonics Reviews* 18, 2300724 (2024), IF = 11.0, ([pdf](#)) ([supplementary](#)) ([ArXiv](#)) ([dataset](#))
2. J. Hayden, M. Geiser, M. Gianella, R. Horvath, A. Hugi, [L. Sterczewski](#), and M. Mangold, "Mid-Infrared Dual-Comb Spectroscopy with Quantum Cascade Lasers," *APL Photonics* 9, 031101, (2024), IF = 5.6. ([pdf](#)) ([AIP](#))
3. J. Boguslawski, [L. A. Sterczewski](#), D. Stachowiak, and G. Sobon, "Intracavity filtering in SESAM mode-locked fiber lasers: soliton effects and noise performance," *Optics Express* 31, 27667-27676 (2023), IF = 3.80, ([pdf](#)) ([OPG](#)) ([supplementary](#)) ([code & data](#)) ([ArXiv](#))
4. J. Ciazela, J. Bakala, M. Kowalinski, B. Pieterek, M. Steslicki, M. Ciazela, G. Paslawski, N. Zalewska, [L. Sterczewski](#), Z. Szaforz, M. Jozefowicz, D. Marciniak, M. Fitt, A. Sniadkowski, M. Rataj, and T. Mrozek, "Lunar ore geology and feasibility of ore mineral detection using a far-IR spectrometer," *Frontiers in Earth Science* 11, 1190825 (2023), IF = 3.66. ([pdf](#)) ([Frontiers](#)) ([code](#)) ([ArXiv](#))
5. [L. A. Sterczewski](#), and J. Sotor, "Two-photon imaging of soliton dynamics," *Nature Communications* 14, 3339 (2023), IF= 17.69. ([pdf](#)) ([NPG](#)) ([ArXiv](#))
6. [L. A. Sterczewski](#), M. Fradet, C. Frez, S. Forouhar, and M. Bagheri, "Battery-operated mid-infrared diode laser frequency combs," *Laser & Photonics Reviews* 16, 2200224 (2022), IF = 10.95. ([pdf](#)) ([ArXiv](#)) ([Wiley](#)) ([Journal cover](#))
7. H. Tian, R. Li, T. Endo, T. Kato, A. Asahara, [L. A. Sterczewski](#), K. Minoshima, "Dual-comb spectroscopy using free-running mechanical sharing dual-comb fiber lasers," *Applied Physics Letters* 121, 211104, (2022). IF = 4.0. ([pdf](#)) ([AIP](#)) ([ArXiv](#))
8. H. Tian, R. Li, [L. A. Sterczewski](#), T. Kato, A. Asahara, K. Minoshima, "Quasi-real-time dual-comb spectroscopy with 750-MHz Yb: fiber combs," *Optics Express* 30, 28427–28437 (2022), IF = 3.89. ([pdf](#)) ([OPG](#)) ([video](#)) ([ArXiv](#))
9. M. Kowalczyk, [L. A. Sterczewski](#), X. Zhang, V. Petrov, and J. Sotor, "Dual-dispersion-regime dual-comb mode-locked laser," *Optics Letters* 47, 1762–1765 (2022), IF = 3.78. ([pdf](#)) ([code & data](#)) ([OPG](#)) ([ArXiv](#)) ([suppl.](#))
10. [L. A. Sterczewski](#)\*, T.-L. Chen\*, D. C. Ober, C. R. Markus, C. L. Canedy, I. Vurgaftman, C. Frez, J. R. Meyer, M. Okumura, and M. Bagheri, "Cavity-enhanced Vernier spectroscopy with a chip-scale mid-infrared frequency comb," *ACS Photonics* 9, 994–1001 (2022), [[Paper on the cover](#)], IF = 7.53. ([pdf](#)) ([ACS](#)) ([ArXiv](#)) ([Journal Cover](#))
11. I. Vurgaftman, C. D. Merritt, C. L. Canedy, C. S. Kim, M. Kim, W. W. Bewley, [L. A. Sterczewski](#), M. Bagheri, C. Frez, and J. R. Meyer, "Toward Robust and Practical Interband Cascade Laser Frequency Combs: A Perspective," *Applied Physics Letters* 119, 230503 (2021), IF = 3.79. ([pdf](#)) ([AIP](#))
12. [L. A. Sterczewski](#), M. Bagheri, C. Frez, C. L. Canedy, I. Vurgaftman, M. Kim, C. S. Kim, C. D. Merritt, W. W. Bewley and J. R. Meyer, "Interband cascade laser frequency combs (invited review)," *Journal of Physics Photonics* 3, 042003 (2021), IF = 3.88, ([pdf](#)) ([IOP](#))
13. M. Kowalczyk, [L. A. Sterczewski](#), X. Zhang, V. Petrov, Z. Wang, and J. Sotor, "Dual-comb femtosecond solid-state laser with inherent polarization-multiplexing," *Laser & Photonics Reviews* 15, 2000441 (2021), [[Journal cover paper](#)], IF = 13.14, ([pdf](#)) ([ArXiv](#)) ([suppl.](#)) ([Wiley](#)) ([Cover](#))

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14. [L. A. Sterczewski](#) and M. Bagheri, "Subsampling dual-comb spectroscopy," *Optics Letters* 45, 4895-4898 (2020), IF = 3.71, [[Featured paper by OSA](#)] ([pdf](#)) ([code](#)) ([OSA](#)) ([Paper promo](#))
  15. [L. A. Sterczewski](#), C. Frez, S. Forouhar, D. Burghoff, and M. Bagheri, "Frequency-modulated diode laser frequency combs at 2  $\mu\text{m}$  wavelength," *APL Photonics* 5, 076111 (2020) [[Featured by AIP Scilight](#)], [[Featured on the cover](#)], IF = 4.86. ([pdf](#)) ([suppl.](#)) ([AIP](#)) ([Scilight](#)) ([Journal cover](#))
  16. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, Y. Yang, D. Burghoff, J. Reno, Q. Hu, and G. Wysocki, "Terahertz spectroscopy of gas mixtures with dual quantum cascade laser frequency combs," *ACS Photonics* 7, 1082-1087 (2020), IF = 6.86, ([pdf](#)) ([ACS](#)) ([accepted](#))
  17. [L. A. Sterczewski](#), M. Bagheri, C. Frez, C. L. Canedy, I. Vurgaftman, and J. R. Meyer, "Mid-infrared dual-comb spectroscopy with room-temperature bi-functional interband cascade lasers and detectors," *Applied Physics Letters* 116, 141102 (2020) [[Editor's pick](#)], [[Featured by AIP Scilight](#)], IF = 3.60. ([pdf](#)) ([accepted version](#)) ([AIP](#)) ([Scilight](#))
  18. [L. A. Sterczewski](#), M. Bagheri, C. Frez, C. L. Canedy, I. Vurgaftman, M. Kim, C. S. Kim, C. D. Merritt, W. W. Bewley, and J. R. Meyer, "Near-infrared frequency comb generation in mid-infrared interband cascade lasers," *Optics Letters* 44, 5828-5831 (2019), IF = 3.71. ([pdf](#)) ([OSA](#)) ([accepted version](#))
  19. [L. A. Sterczewski](#), A. Przewloka, W. Kaszub, and J. Sotor, "Computational Doppler-limited dual-comb spectroscopy with a free-running all-fiber laser," *APL Photonics*, 4, 116102 (2019) [[Editor's pick](#)], IF = 4.86. ([pdf](#)) ([suppl.](#)) ([APL](#)) ([ArXiv](#))
  20. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, and G. Wysocki, "Computational coherent averaging for free-running dual-comb spectroscopy," *Optics Express* 27, 23875-23893 (2019), IF = 3.67. ([pdf](#)) ([OSA](#)) ([ArXiv](#))
  21. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, Y. Yang, D. Burghoff, J. Reno, Q. Hu, and G. Wysocki, "Terahertz hyperspectral imaging with dual chip-scale combs," *Optica*, 6, 766-771 (2019). [[Artykuł opisany przez media: ScienceDaily i Photonics Online](#)], IF = 9.78. ([pdf](#)) ([suppl.](#)) ([ArXiv](#)) ([ScienceDaily](#), [Princeton Website](#), [Photonics Online](#)) ([Top-downloaded paper](#))
  22. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, M. Bagheri, C. Frez, I. Vurgaftman, C. L. Canedy, W. W. Bewley, C. D. Merritt, C. S. Kim, M. Kim, J. R. Meyer, and G. Wysocki, "Mid-infrared dual-comb spectroscopy with interband cascade lasers," *Optics Letters* 44, 2113-2116 (2019), IF = 3.71. ([pdf](#)) ([ArXiv](#))
  23. J. Westberg<sup>\*</sup>, [L. A. Sterczewski](#)<sup>\*</sup>, F. Kapsalidis, Y. Bidaux, J. M Wolf, M. Beck, J. Faist, and G. Wysocki, "Dual-comb spectroscopy using plasmon-enhanced-waveguide dispersion-compensated quantum cascade lasers," *Optics Letters* 43, 4522-4525 (2018), IF = 3.86. ([pdf](#))
  24. M. Bagheri, C. Frez, [L. A. Sterczewski](#), I. Gruidin, M. Fradet, I. Vurgaftman, C. L. Canedy, W. W. Bewley, C. D. Merritt, C. S. Kim, M. Kim, and J. R. Meyer, "Passively mode-locked interband cascade optical frequency combs," *Scientific Reports* 8, 3322 (2018), IF = 4.01. ([pdf](#)) ([suppl.](#))
  25. [L. A. Sterczewski](#), K. Nowak, B. Szlachetko, M. P. Grzelczak, B. S-. Siega., S. Plinska, W. Malinka, and E. F. Plinski, "Chemometric Evaluation of THz Spectral Similarity for the Selection of Early Drug Candidates," *Scientific Reports* 7, 14583 (2017), IF = 4.01, ([pdf](#)) ([suppl.](#))
  26. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, C. L. Patrick, C. S. Kim, M. Kim, C. L. Canedy, W. W. Bewley, C. D. Merritt, I. Vurgaftman, J. R. Meyer, and G. Wysocki, "Multiheterodyne spectroscopy using interband cascade lasers," *Optical Engineering* 57, 011014 (2018), IF = 1.28, ([pdf](#)) ([ArXiv](#))
  27. J. Westberg<sup>\*</sup>, [L. A. Sterczewski](#)<sup>\*</sup>, and G. Wysocki, "Mid-infrared multiheterodyne spectroscopy with phase-locked quantum cascade lasers," *Applied Physics Letters* 110, 141108 (2017), IF = 3.50, ([pdf](#)) ([suppl.](#))
  28. [L. A. Sterczewski](#)<sup>\*</sup>, J. Westberg<sup>\*</sup>, and G. Wysocki, "Molecular dispersion spectroscopy based on Fabry-Pérot quantum cascade lasers," *Optics Letters* 42, 243-246 (2017), IF = 2.99. ([pdf](#))

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29. [L. A. Sterczewski](#), M. P. Grzelczak, K. Nowak, B. Szlachetko, and E. F. Plinski, "Bayesian separation algorithm of THz spectral sources applied to D-glucose monohydrate dehydration kinetics," *Chemical Physics Letters* 644, 45–50 (2016), IF = 1.82, ([pdf](#))
  30. [L. A. Sterczewski](#), J. Westberg, and G. Wysocki, "Tuning properties of mid-infrared Fabry-Pérot quantum cascade lasers for multiheterodyne spectroscopy," *Photonics Letters of Poland* 8, 113–115 (2016), IF = 0.38. ([pdf](#))
  31. [L. A. Sterczewski](#), M. P. Grzelczak, and E. F. Plinski, "Heating system of pellet samples integrated with terahertz spectrometer," *Review of Scientific Instruments* 87, 13106 (2016), IF = 1.63 ([pdf](#))
  32. [L. A. Sterczewski](#), M. P. Grzelczak, and E. F. Plinski, "Terahertz antenna electronic chopper," *Review of Scientific Instruments* 87, 14702 (2016), IF = 1.63, ([pdf](#))
  33. [L. A. Sterczewski](#), M. P. Grzelczak, K. Nowak, and E. F. Plinski, "Cast terahertz lenses made of caramelized sucrose," *Optical Engineering* 55, 90505 (2016), ([pdf](#))
  34. K. Nowak, E. F. Plinski, B. Karolewicz, P. P. Jarzab, S. Plinska, B. Fuglewicz, M. J. Walczakowski, L. Augustyn, [L. A. Sterczewski](#), M. P. Grzelczak, M. Hruszowiec, G. Beziuk, M. Mikulic, N. Palka, and M. Szustakowski, "Selected aspects of terahertz spectroscopy in pharmaceutical sciences," *Acta Poloniae Pharmaceutica* 72, 851–866 (2015), IF = 0.88 ([pdf](#))

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\* Denotes equal contribution;

## PhD Thesis:

1. [L. A. Sterczewski](#), "Signal processing in terahertz and mid-infrared spectroscopy with frequency combs," Ph.D. thesis, Wroclaw University of Science and Technology (2018). ([pdf](#))

## Patents:

1. L. A. Sterczewski, J. Westberg, and G. Wysocki, "Fast computational phase and timing correction for multiheterodyne spectroscopy," US Patent 11,015,975 (2021), International Patent Application, WO 2018/213286 A1 (2018). ([pdf US](#)) ([pdf WO](#))
2. L. A. Sterczewski, J. Westberg, and G. Wysocki, "Fast computational phase and timing correction for multiheterodyne spectroscopy," US Patent 11,499,867 (2022). ([pdf US](#))

## Research monographs, chapters:

1. G. Wysocki, G. Wysocki, J. Westberg, and L. A. Sterczewski, "Multi-Heterodyne Spectroscopic Sensing and Applications of Mid-Infrared and Terahertz Quantum Cascade Lasers", in *Mid-Infrared and Terahertz Quantum Cascade Lasers*, book edited by D. Botez and M. A. Belkin (Cambridge University Press, Cambridge, 2023). ([pdf](#)) ([Cambridge](#))

## Invited presentations:

1. [L. A. Sterczewski](#), and H. Tian, "Phase Noise in Free-running Dual-comb Spectroscopy" (invited)", Conference on Lasers and Electro-Optics (CLEO 2024), Charlotte, NC, USA, May 5-10 (2024).
2. [L. A. Sterczewski](#), "Organic nonlinear crystals for long-wave infrared and terahertz spectroscopy pumped at telecommunication wavelengths (invited)", SPIE Photonics Europe, Strasburg, France, April 9 (2024).

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3. L. A. Sterczewski, and M. Bagheri, "Broadband high-resolution Fourier spectrometry with chip-scale combs (invited)", IEEE RAPID (Research and Applications of Photonics in Defense) 2023, Miramar Beach, FL, USA, September 11-13 (2023). [Supported by a travel grant by DoD]
  4. L. A. Sterczewski et al., "Chip-scale mid-infrared spectroscopy using electrically-pumped frequency comb sources (invited)", 11<sup>th</sup> Advanced Lasers and Photon Sources Conference (ALPS2022), Yokohama, Japan, April 18-21 (2022).
  5. L. A. Sterczewski, "Searching for life in space (invited popular science talk in Polish)", Gdynia Explory Week, Warsaw, Poland, October 20 (2021).
  6. L. A. Sterczewski, "Frequency comb spectroscopy – making it compact and power efficient (invited)", 2021 OSA Imaging & Sensing Congresses (online), July 19-23 (2021).
  7. L. A. Sterczewski et al., "Chip-scale electrically-pumped optical frequency combs (invited)", Center for Quantum Research and Technology, The University of Oklahoma, Norman, OK (online), February 23 (2021).
  8. L. A. Sterczewski et al., "Chip-scale electrically-pumped optical frequency combs (invited)", Polish Astrobiology Society (online), November 5 (2020).
  9. L. A. Sterczewski et al., "Interband Cascade Laser Frequency Combs", 6<sup>th</sup> International WORKshop on Infrared Technologies, Princeton, NJ, USA, October 29-30 (2019).

Total of 47 oral presentations, mostly at international conferences (US).

## Prizes and Awards:

1. Winner of the "Secundus" and "Primus" programme competition for quality research papers with university affiliation, Category: Automation, Electronics, and Electrical Engineering, Wroclaw, Poland, Nov. 2020, June 2021, April 2022, April 2023, April 2024.
2. "Best Student Paper" presented at SPIE Photonics West - Terahertz, RF, Millimeter, and Submillimeter-Wave Technology and Applications IX, San Francisco, USA, 2016.
3. "Best MSc Presentation" in the nationwide Jan Wojcik contest for the best diploma thesis in the field of photonics, organized by the Polish Foundation of Photonics and Optic Fibers, Warsaw, Poland, 2015.
4. 3<sup>rd</sup> place winner in the best speech contest: "Terahertz lollipops", International SPIE Student Chapter Meeting 2015 conference, 10th Anniversary, Wroclaw, 2015.
5. Distinction in the nationwide Professor Adam Smolinski contest for the best diploma thesis in the field of optoelectronics, organized by the Polish Optoelectronics Committee of the Association of Polish Electrical Engineers SEP, 2014.
6. 4<sup>th</sup> place in the TOP10 contest for 10 best graduates of the WUST, Electronics Department, 2014.
7. Distinctive research presented during the 12<sup>th</sup> Students' Science Conference, Poland, 2014.

## Scholarships:

8. Scholarship of the Polish Ministry of Science and Higher Education for outstanding young scientists, December 2020; Duration: 3 years.
9. Scholarship of the Foundation for Polish Science (FNP) for young scientists within the START program, May 2018; Duration: 1 year.
10. Scholarship of the Polish Ministry of Science and Higher Education for PhD students with Outstanding Achievements, December 2017.
11. Fellowship: NASA Jet Propulsion Laboratory Graduate Fellowship Program for research on interband cascade laser frequency combs, Pasadena CA, USA, May 2017. Duration: 3 months.
12. Scholarship for best PhD students financed by the funds of Wroclaw University of Science and Technology, Wroclaw; Awarded three times: March and November 2016; November 2017.

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## Funding (research awards)

1. 11th Polish-Taiwanese/Taiwanese-Polish Joint Research Call, – “RaVeMUSA: Radial Velocity Measurements using Synthesizable Astrocombs”, Duration: 3 years, June 2024, Amount: 300 kEUR for the Polish side.
2. European Research Council (ERC) Starting Grant – “TeraERC: Chip-based room-temperature terahertz frequency comb spectrometers”, Duration: 5 years, December 2023, European Research Council, Amount: 1.5 MEUR.
3. Bonus on the Horizon 2 - CEMoS-OFC – "Computationally enhanced molecular sensing using optical frequency combs (CEMoS-OFC)", Duration: 2 years, Ministry of Science and Higher Education (MEiN), Republic of Poland, within the Bonus on the Horizon 2 program (additional funds to extend the topical coverage of the EU Horizon research grant). Amount: ~\$40 000.
4. Marie Skłodowska-Curie Fellowship, "Computationally enhanced molecular sensing using optical frequency combs (CEMoS-OFC)", Duration: 2 years, December 2021. Funded by the European Union (Horizon 2020), Amount: ~\$200 000. <https://sterczewski.com/cemos-ofc/>
5. Fellowship: NASA Postdoctoral Program (NPP) at the NASA Jet Propulsion Laboratory, California, USA, October 2018; Duration: 2 years. Proposal title: "*Interband Cascade Optical Frequency Comb Spectroscopy of C-H bonds*", Amount: ~\$180 000.
6. Fellowship: The Kosciuszko Foundation Grant for the academic year 2017/18 for research in the United States (Princeton University), May 2017. Duration: 6 months. Proposal title: "*Non-destructive evaluation of pharmaceuticals degradation and counterfeit using dual-comb terahertz spectroscopy*". Amount: \$18 000.
7. Research grant: “Młoda Kadra” co-funded by the Polish Ministry of Science Higher Education, Proposal title(s): "*Advanced SCADA system applied to THz techniques*" and "*High-resolution laser spectroscopy using unstabilized ultrafast fiber lasers*". Duration: 1 year, Awarded twice: in 2014 and 2018 in Poland, Amount: ~15 000 PLN (4000 Euro) each..
8. Travel grant to participate in the Thirty Meter Telescope Workshop (TMT) in Hawaii. USA, January 2020, Postponed due to the pandemic, Amount: ~\$2000.
9. Fellowship provided by the Dean of the Graduate School at Princeton University, awarded twice: in July 2015 (\$40 336) and in September 2016 (\$72 717). The award covered the tuition, health plan, and stipend.

## Media outreach and popularization of science

### Video interviews

1. Podcast in Radio Naukowe on 2024-03-18. „Fale terahercowe – technologia wkracza w kolejny zakres spektrum” ([podcast in Polish](#)), >65 K views in 2 months.
2. Radio Wrocław Interview (by Leszek Mordarski) on 2023-09-21. Topic: Career path, ERC grant
3. "Urządzenia terahercowe w kieszeni? Prestiżowy grant na miniaturyzację technologii", Politechnika Wrocławska, Youtube, Date: 2023-09-05. ([link](#))
4. "Do czego przydają się miniaturowe lasery w kosmosie?", Wrocław University of Science & Technology, Youtube, Date: 2021-05-26. ([link](#))
5. "Polscy naukowcy pracujący w NASA. „Większość z nas nie zamieniłaby tego na nic innego”", Dzień Dobry TVN, TVN (Discovery) Poland, Date: 2020-03-14. ([link](#))
6. "Lukasz Sterczewski's early interest in building things led him to his current work", Optical Society of America, OSA Stories, Date: 2018-08-21. ([Part 1](#)) ([Part 2](#)) ([Part 3](#))

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## Journal interviews

1. „Polacy zapisali się w historii NASA. Nadal biorą udział w podboju kosmosu”, Wprost, 24.04.2024. ([interview](#))
2. "TeraERC: o motywacji do przygotowania grantu, trudnych początkach oraz inspiracji w dążeniu do realizacji marzeń naukowych.", HPK, Serwis RP, Date: 2023-12-09. ([interview](#))
3. "NPP Alumni of 3 months, 1 year, and 4 years share newsworthy knowledge", NASA Postdoctoral Program (NPP) Quarterly Newsletter Volume 5, Issue 2, pp. 4, Date: 2021-07-01. ([interview](#))
4. "It's close to the stars from WUST", Wroclaw University of Science & Technology, University News, Date: 2020-01-13. ([EN](#)) ([PL](#))
5. "Wroclawski naukowiec w Ameryce", Gazeta Polska Codziennie (2525), Date: 2020-01-08. ([PL](#))

## Research highlights

1. "Prestiżowe granty dla polskich inżynierów. Dostaną 3 mln euro na supernowoczesne badania" [in Polish], National Geographic, Date: 2023-09. ([Nat. Geo.](#))
2. "Prestigious ERC grant for our scientist" [in EN & PL], WUST, Data: 2023-09. ([WUST EN](#)) ([WUST PL](#))
3. "Naukowcy z PWr opracowali nową metodologię diagnostyki laserów impulsowych", Forum Akademickie, Date: 2023-06. ([Forum Akademickie](#))
4. "Publikacja o solitonach w „Nature Communications”. Jej autorami są naukowcy z W12", WUST, Data: 2023-06. ([WUST/PWr](#))
5. "Optical frequency combs operating at 2 μm wavelength are used for dual-comb spectroscopy", AIP Scilight, Data: 2020-07. ([AIP Scilight](#))
6. "An interband cascade platform permits on-chip mid-infrared dual-comb spectroscopy", AIP Scilight, Date: 2020-04. ([AIP Scilight](#))
7. "Terahertz Imaging System on a Chip Offers Speed and Portability", Photonics Spectra, Date: 2019-10. ([PhotonicsMedia](#))
8. "Closing the terahertz gap: Tiny laser is an important step toward new sensors", ScienceDaily, Date: 2019-07-24. ([ScienceDaily](#))
9. "Miniature Laser Crucial for Development of New Medical Sensors", AZoOptics, Date: 2019-07-25. ([AZoOptics](#))
10. "Innovative tiny laser has potential uses in drug quality control, medical diagnosis, airplane safety", Princeton University, Date: 2019-07-24. ([Princeton](#))

## Miscellaneous

1. Our *ACS Photonics* paper is featured on the cover of the March 2022 issue. I designed the cover and rendered it in Blender.
2. Our *Laser & Photonics Reviews* paper is featured on the cover of the August 2021 issue.
3. Our THz hyperspectral imaging paper is one of the top-downloaded articles from *Optica*
4. The CLEO conference has been using a photo from my 2018 talk "*Terahertz dual-comb spectroscopy using quantum cascade laser frequency combs*" on the abstract submission page since 11/2018.
5. The July 2020 issue cover of *APL Photonics* features our research on 2 μm combs.

## Reviewer activities

### Grant proposal reviewer

1. Swiss National Science Foundation, SPARK program (4 reviews),
2. Panellist of the NASA SIMPLEX (Small Satellite Concept) selection program (1 review),
3. European Science Foundation, Bilateral Scientific Cooperation China (NSFC) (1 review),



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4. Member of the European Science Foundation College of Expert Reviewers.
  5. European Science Foundation, Bilateral Scientific Cooperation China (NSFC) (1 review),
  6. Agence Nationale de la Recherche (France), AAPG 2024 programme (1 review).

### Journal reviewer:

1. Nature Communications, IF=16,60 (1 review)
2. Light Science & Applications, IF=14,52, (6 reviews),
3. Laser & Photonics Reviews, IF=13,18, (4 reviews),
4. Optica, IF=9,78, (2 reviews),
5. Photonics Research, IF=7,52, (2 reviews)
6. ACS Photonics, IF=7,07, (4 reviews)
7. APL Photonics, IF=6,38, (4 reviews),
8. Communication Physics, IF=5,50, (1 review),
9. Journal of Lightwave Technology, IF=4,14, (1 review),
10. Optics Express, IF=3,67, (17 reviews),
11. Applied Physics Letters, IF= 3,59, (3 reviews),
12. Journal of Optics and Laser Technology, IF=3,23, (4 reviews),
13. Analyst, IF=3,86, (1 review),
14. ACS Omega, IF=2,87, (2 reviews),
15. IEEE Transactions on Terahertz Science and Technology, IF=3,51, (1 review),
16. Optics Letters, IF=3,71, (3 reviews),
17. Optical Materials Express, IF=3,07, (1 review)
18. Journal of Infrared, Millimeter, and Terahertz Waves, IF=1,76, (1 review).
19. Journal of Chemometrics, IF=1,79, (1 review).
20. Photonics Technology Letters, IF=2,41 (1 review).
21. Optical Fiber Technology, IF=2,8 (1 review)
22. Applied Physics Letters, IF=3,97 (2 reviews)
23. Scientific Reports, IF=4,60, (1 review)
24. Measurement, IF= 5,13 (1 review)
25. Engineering Reports, IF=2,0 (1 review)
26. Review of Scientific Instruments, IF = 1,3 (1 review)

Total: approximately 60 reviews for peer-reviewed journals

## **Narrative CV**

I am an optoelectronic engineer and I follow the principle taken from "The Little Prince" that what is essential, is invisible to the eyes. This is why I deal with mid- and far-infrared laser radiation, which appears as invisible to humans. It is the part of the electromagnetic spectrum with wavelengths from a few to several hundred micrometers, that is, ten to a thousand times longer than the visible range. When interacting with matter, such light makes it possible to identify hazardous substances in the air, enables suitability and authenticity testing of medicines and non-destructive diagnostics of materials without the threat of ionizing radiation. It is also used in skin cancer diagnostics. Importantly, the measurement is contactless. Instead of physical contact with the sample, all that is needed is a measurement of the light it reflects or transmits.

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Despite such numerous applications of infrared light, we are far from instruments with high miniaturization, room temperature operation and battery power capability. The vision of such devices, called laser spectrometers, is a dream for smartphone manufacturers. While we are doing well in measuring simple volatiles like methane or ethane, and even using electrochemical technologies, complex carcinogenic volatiles like benzopyrene urgently need optical systems for selective detection. Another challenge is mixtures of compounds, which require broadband measurements at multiple wavelengths at once, rather than a single wavelength as conventionally.

The answer to these challenges is a new type of semiconductor laser called an optical frequency comb, which I have been researching since 2015. It emits hundreds or thousands of parallel lines that enable spectroscopy of a medium without any moving parts. My passion and skills were noticed early in my PhD by a researcher who gave me the opportunity to work on these sources at one of the world's top universities (Princeton University in the US). There, I demonstrated the applications of frequency combs to broadband spectroscopy of gases and pharmaceuticals. In 2017, I was awarded a prestigious NASA JPL summer postdoctoral fellowship in California to develop interband cascade laser technology there, which had previously been used to detect methane on Mars in the Curiosity mission. In 2019, I returned to NASA JPL as a postdoctoral fellow to explore new photonic platforms and room-temperature infrared detection capabilities. I shared my knowledge of lasers and spectroscopy with chemists at the California Institute of Technology (Caltech) as a visiting researcher. Scientifically, I spent almost five years in the US.

After returning to Poland in 2021, I established the Terahertz Optoelectronics Laboratory at the Wrocław University of Technology, where we are easing access to the mid- and far-infrared. My research covers laser physics, engineering of optical properties and spectroscopic applications. My extensive scientific experience and demonstration of the potential for groundbreaking research in Poland allowed me to receive a prestigious European Research Council (ERC) grant. Together with a newly established research group, we are working on gaining access to the difficult terahertz range, which can be useful in space mining for the search of precious metal ores.

I am a proud leader of young, talented scientists, with whom we are aiming to change the notion that access to the far- and mid-infrared range is elusive and challenging.

References available upon request.