

Maciek Wielgus

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EDUCATION

Warsaw University of Technology <i>Ph.D. in Machine Design and Maintenance: Photonic Engineering</i> Dissertation: Adaptive decomposition and analytic signal concept in the interferometric fringe pattern analysis	Sep 2016
Warsaw University of Technology <i>M.S. in Robotics and Automatic Control: Photonic Engineering (interferometric pattern analysis)</i>	Dec 2010
Warsaw University <i>B.S. in Mathematics: Numerical Analysis (partial differential equations)</i>	Sep 2010

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher <i>Max Planck Institute for Radio Astronomy, Bonn, Germany</i>	Oct 2021 – present
Black Hole Initiative Postdoctoral Fellow <i>Harvard University, Cambridge, USA (mentor: Shep Doeleman)</i>	May 2017 – Aug 2021
Confronting Theories of Accretion with Observations, KITP Program <i>Visiting Scholar, UCSB, Santa Barbara, USA</i>	Jan 2017 – Mar 2017
Postdoctoral researcher at Nicolaus Copernicus Astronomical Center <i>Polish Academy of Sciences, Warsaw, Poland (mentors: Wlodek Kluźniak, Marek Abramowicz)</i>	2016 – 2017
Internship at Center for Astrophysics Harvard & Smithsonian <i>Cambridge, USA (mentors: Ramesh Narayan, Olek Sądowski)</i>	Oct 2015 – Dec 2015
Visiting Scholar at Kavli Institute for Theoretical Physics, UCSB <i>Santa Barbara, USA (mentors: Omer Blaes, Wlodek Kluźniak)</i>	Jun 2015
Designing industrial image processing algorithms at KSM Vision <i>Warsaw, Poland</i>	2014 – 2015
Visiting Scholar at Peking University Kavli Institute for Astronomy and Astrophysics <i>Beijing, China (mentors: Marek Abramowicz, Fukun Liu)</i>	Aug 2014
Visiting Scholar at University of Capetown <i>Capetown, South Africa (mentor: George F. R. Ellis)</i>	May 2014
Internship at National Center of the Industrial Technology <i>Buenos Aires, Argentina (mentors: Guillermo Kaufmann, Alejandro Frederico)</i>	Oct 2013 – Nov 2013
Internship at Center for Astrophysics Harvard & Smithsonian <i>Cambridge, USA (mentors: Ramesh Narayan, Olek Sądowski)</i>	Jun 2013 – Aug 2013
Internship at the College of Charleston <i>Charleston, USA (mentor: Chris Fragile)</i>	May 2013 – Jun 2013
Engineer at the Institute of Electron Technology <i>Warsaw, Poland</i>	2011 – 2013

RESEARCH INTERESTS

- astrophysics of compact objects
- general relativity
- very long baseline radio interferometry
- applied signal and image processing
- physics of accretion
- magnetohydrodynamics
- developing EHT data reduction and inspection pipeline

AWARDS

EHT Early Career Award (individual)	2021 and 2020
Group Award (A) from the Royal Astronomical Society (EHT collaboration)	2021
Albert Einstein medal (EHT collaboration)	2020
Bruno Rossi Prize for a contribution to High Energy Astrophysics (EHT collaboration)	2020
Breakthrough Prize in Fundamental Physics (EHT collaboration)	2020
Smithsonian Institute American Ingenuity Award (EHT collaboration)	2019
Black Hole Initiative Prize for scientific contributions to the EHT project (individual)	2019
National Science Foundation Diamond Achievement Award (EHT collaboration)	2019
First prize in IXth Nationwide Competition for a Best PhD Thesis "Young Innovators"	2017
Polish Prime Minister Award for the best PhD thesis in engineering	2017
Foundation for Polish Science START award (in 2015 with distinction as 1 of 5 young scientists nationwide)	2015 – 2016
Academic performance award from Polish Ministry of Science and Higher Education	2013
Scientific scholarship and travel award from the Center for Advanced Studies Warsaw University of Technology	2012 – 2013
SPIE best student presentation award, International Conference on Advanced Topics in Optoelectronics, Microelectronics and Nanotechnology, Constanza, Romania	2012
Laureate (6th place nationwide) of the National Mathematics Competition for high school students	2005

Publications

61 reviewed scientific journal papers (14 as a first author). 81 items **listed on ADS** (22 as a first author). 4678 citations, h-index=21, 45 papers cited at least 10 times (ADS, December 2021). Complete list of papers appended.

TALKS

I have given well over 100 professional talks. Below 10 talks that I am particularly happy with.

<i>Shadows of the past, shadows of the future,</i> 16th Marcel Grossmann Meeting (invited)	Jul 2021
<i>Would we know a wormhole if we saw one?</i> 16th Marcel Grossmann Meeting (invited)	Jul 2021
<i>Polarized emission around the M87 supermassive black hole,</i> SLAC seminar, Stanford (invited)	Mar 2021

<i>Monitoring M87* in 2009–2017 with the EHT,</i> Seminar at Radboud University, Nijmegen (invited)	Feb 2020
<i>Analyzing time variability of Sgr A* in the EHT data,</i> New Horizons in Galactic Center Astronomy and Beyond, Yokohama	Oct 2019
<i>Observing AGN sources with the Event Horizon Telescope,</i> IAU 356, Addis Ababa	Oct 2019
<i>Optically thick accretion: from theory to the most recent results,</i> University of Waterloo, astronomy seminar (invited)	Sep 2019
<i>Event Horizon Telescope,</i> CTA 1st Science Symposium, Bologna (invited)	May 2019
<i>First EHT results,</i> Astronomy Department, Yale University (invited)	Apr 2019
<i>Studying variability of Sgr A* with the EHT,</i> CfA, Harvard & Smithsonian	Feb 2018

GRANTS AND FORMAL PROJECTS

PI: Dynamics of the Centaurus A jet base on a light-day scale <i>ALMA cycle 8 VLBI observations</i>	2022
Co-PI: Probing relativistic jets through mm-VLBI of X-ray binaries <i>GMVA VLBI observations, PI: Alex Tetarenko</i>	2022
Co-PI: Ultra-high resolution imaging of 3C84 <i>ALMA cycle 8 VLBI observations</i>	2022
PI: Thin disks GRRMHD simulations <i>3×10^7 CPU hours on PROMETHEUS supercomputer from PLGRID</i>	2018 – 2021
Named participant: Variable accretion flows <i>Polish National Science Center Maestro grant, PI: Wlodek Kluźniak</i>	2013 – 2018
CO-PI: Adaptive processing of fringe patterns in optical whole-field measurements <i>Polish National Science Center Opus grant, PI: Krzysztof Patorski</i>	2013 – 2015
PI: Automatic image analysis for nanomaterials research <i>Foundation for Polish Science VENTURES grant</i>	2012 – 2014
Named participant: Turbulent viscosity in non-stationary black hole accretion disks <i>Polish National Science Center Opus grant, PI: Marek Abramowicz</i>	2012 – 2014

TEACHING EXPERIENCE

Lecturer of astrophysics at the relativistic accretion workshop, University of Bremen <i>Transonic flows, ideal MHD, MRI</i>	Sep 2016
Teaching at Warsaw University of Technology <i>Optomechatronics lab, Mechatronic systems lab, and Instrumental optics lab</i>	2011 – 2015
Teaching assistant and tutor at Warsaw University <i>Calculus I & II, linear algebra for math students</i>	2010 – 2011

OTHER ACTIVITIES

- leading the EHT Time Domain Working Group since 2018
- one of the key contributors to the EHT data set reduction and inspection pipeline development
- reviewer for MNRAS, A&A, ApJ, PRL, New Astronomy, Applied Optics, Optics Express, Optics Letters
- SOC member, EHT polarization workshop, Max-Planck Institute for Radio Astronomy, July 2019
- advised multiple students with scientific projects (W. Yan, D. Bollimpalli, S. Steel, D. Lancova)
- named participant on multiple VLBI observational proposals
- reviewer of grant proposals at the Czech Science Foundation in the Astronomy panel

- member of the Polish Astronomical Society

LANGUAGES

- **Polish** [fluent]
- **English** [fluent]
- **Russian** [basic]
- **Spanish** [trying to learn]

NON-SCIENTIFIC INTERESTS

- travelling and tourism
- running (mostly long distances)
- playing the guitar

Journal papers

61. *Collimation of the relativistic jet in the quasar 3C 273*, Okino, H., Akiyama, K., Asada, K., +32 authors, submitted to ApJ, arXiv:2112.12233,
60. *The intrinsic structure of Sagittarius A* at 1.3 cm and 7 mm*, Cho, I., Zhao, G.-Y., Kawashima, T., +63 authors, accepted in ApJ, arXiv:2112.04929,
59. *The Variability of the Black-Hole Image in M87 at the Dynamical Time Scale*, Satapathy, K., Psaltis, D., Ozel, F., Medeiros, L., Dougall, S. T., Chan, C., **Wielgus, M.**, +231 authors, accepted in ApJ, arXiv:2111.01317,
58. *Photon rings of spherically symmetric black holes and robust tests of non-Kerr metrics*, **Wielgus, M.**, PRD 104, 124058 (2021), arXiv:2109.10840,
57. *Event Horizon Telescope observations of the jet launching and collimation zone in Centaurus A*, Janssen, M., Falcke, H., Kadler, M., Ros, E., **Wielgus, M.**, +266 authors, Nat Astron 5 1017-1028 (2021), arXiv:2111.03356
56. *Persistent Non-Gaussian Structure in the Image of Sagittarius A* at 86 GHz*, Issaoun, S., Johnson, M., Blackburn, L., Broderick, A., Tiede, P., **Wielgus, M.**, + 23 authors, ApJ 915, 99 (2021), arXiv:2104.07610,
55. *Three-dimensional general relativistic Poynting-Robertson effect. IV. Slowly rotating and non-spherical quadrupolar massive source*, De Falco, V., **Wielgus, M.**, PRD 103, 084056 (2021), arXiv:2103.17165,
54. *The Polarized Image of a Synchrotron Emitting Ring of Gas Orbiting a Black Hole*, Narayan, R., et al., ApJ 912, 35 (2021), arXiv:2105.01804,
53. *Light echos and coherent autocorrelations in a black hole spacetime*, Chesler, P., Blackburn, L., Doeleman, S., Johnson, M., Moran, J., Narayan, R., **Wielgus, M.**, Class. Quantum Grav. 38, 13 (2021), arXiv:2012.11778,
52. *Broadband Multi-wavelength Properties of M87 During the 2017 Event Horizon Telescope Campaign*, Algaba, J. C., + 744 authors, ApJL 911, L11 (2021), arXiv:2104.06855,
51. *Polarimetric Properties of Event Horizon Telescope Targets from ALMA*, Goddi, C., + 249 authors, ApJL 910, L14 (2021),
50. *First M87 Event Horizon Telescope Results. VIII. Magnetic Field Structure near The Event Horizon*, EHT Collaboration (240 authors), ApJL 910, L13 (2021),
49. *First M87 Event Horizon Telescope Results. VII. Polarization of the Ring*, EHT Collaboration (239 authors), ApJL 910, L12 (2021),
48. *Elliptical accretion disk as a model for TDEs*, Liu, F., Cao, C., Abramowicz, M., **Wielgus, M.**, Cao, R., Zhou, Z., ApJ 908, 179 (2021), arXiv:2012.05552,
47. *Geometric modeling of M87* as a Kerr black hole or a non-Kerr compact object*, Vincent, F., **Wielgus, M.**, Abramowicz, M., Gourgoulhon, E., J. P. Lasota, + 2 authors, A&A 646, A37 (2021), arXiv:2002.09226,
46. *Reflection-asymmetric wormholes and their double shadows*, **Wielgus, M.**, Horák, J., Vincent, F., Abramowicz, M., PRD 102, 084044 (2020), arXiv:2008.10130,
45. *Gravitational Test Beyond the First Post-Newtonian Order with the Shadow of the M87 Black Hole*, Psaltis, D., + 187 authors, PRL 125, 141104 (2020), arXiv:2010.01055,
44. *Monitoring the Morphology of M87* in 2009-2017 with the Event Horizon Telescope*, **Wielgus, M.**, Akiyama, K., Blackburn, L., + 216 authors, ApJ 901, 67 (2020), arXiv:2009.11842,
43. *Event Horizon Telescope imaging of the archetypal blazar 3C 279 at an extreme 20 microarcsecond resolution*, Kim, J.-Y., Krichbaum, T., Broderick, A., **Wielgus, M.**, + 349 authors, A&A 640, A69 (2020),
42. *Verification of Radiative Transfer Schemes for the EHT*, Gold, R., + 207 authors, ApJ 897, 148 (2020),
41. *THEMIS: A Parameter Estimation Framework for the Event Horizon Telescope*, Broderick, A., + 193 authors, ApJ 897, 139 (2020),
40. *Closure Statistics in Radio Interferometric Data*, Blackburn, L., Pesce, D., Johnson, M., **Wielgus, M.**, Chael, A., Christian, P., Doeleman, S., ApJ 894, 31 (2020), arXiv:1910.02062,
39. *SYMBA: An end-to-end VLBI synthetic data generation pipeline. Simulating Event Horizon Telescope observations of M 87*, Roelofs, F., Janssen, M., + 207 authors, A&A 636, A5 (2020)
38. *Universal Interferometric Signatures of a Black Hole's Photon Ring*, Johnson, M., + 16 authors, Science Advances 6, eaaz1310 (2020), arXiv:1907.04329,

37. *Optically thin outbursts of rotating neutron stars can not be spherical*, **Wielgus, M.**, MNRAS, 488, 4937 (2019), arXiv:1907.11268,
36. *Puffy Accretion Disks: Sub-Eddington, Optically Thick, and Stable*, Lančová, D., Abarca, D., Kluźniak, W., **Wielgus, M.**, + 5 authors, ApJL 884, L37 (2019), arXiv:1908.08396,
35. *EHT-HOPS Pipeline for Millimeter VLBI Data Reduction*, Blackburn, L., Chan, C.-K., Crew, G., Fish, V., Issaoun, S., Johnson, M. D., **Wielgus, M.**, + 8 authors, ApJ 882, 23 (2019), arXiv:1903.08832,
34. *Atmospheric oscillations provide simultaneous measurement of neutron star mass and radius*, Bollimpalli, D., **Wielgus, M.**, Abarca, D., Kluźniak, W., MNRAS 487, 5129 (2019), arXiv:1812.01299,
33. *The Event Horizon General Relativistic Magnetohydrodynamic Code Comparison Project*, Porth, O., + 220 authors, ApJSS 243, 26 (2019), arXiv:1904.04923,
32. *Calibration of ALMA as a Phased Array. ALMA Observations During the 2017 VLBI Campaign* Goddi, C., Martí-Vidal, I., Messias, H., + 14 authors, PASP 131, 075003 (2019), arXiv:1901.09987,
31. *rPICARD: A CASA-based calibration pipeline for VLBI data. Calibration and imaging of 7 mm VLBA observations of the AGN jet in M 87* Janssen, M., + 9 authors, A&A 626, A75 (2019), arXiv:1902.01749,
30. *First M87 Event Horizon Telescope Results. VI. The Shadow and Mass of the Central Black Hole*, EHT Collaboration (214 authors), ApJL 875, L6 (2019), arXiv:1906.11243,
29. *First M87 Event Horizon Telescope Results. V. Physical Origin of the Asymmetric Ring*, EHT Collaboration (221 authors), ApJL 875, L5 (2019), arXiv:1906.11242,
28. *First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole*, EHT Collaboration (215 authors), ApJL 875, L4 (2019), arXiv:1906.11241,
27. *First M87 Event Horizon Telescope Results. III. Data Processing and Calibration*, EHT Collaboration (217 authors, paper coordinated by Blackburn, L., Issaoun, S., **Wielgus, M.**), ApJL 875, L3 (2019), arXiv:1906.11240,
26. *First M87 Event Horizon Telescope Results. II. Array and Instrumentation*, EHT Collaboration (341 authors), ApJL 875, L2 (2019), arXiv:1906.11239,
25. *First M87 Event Horizon Telescope Results. I. The Shadow of the Supermassive Black Hole*, EHT Collaboration (348 authors), ApJL 875, L1 (2019), arXiv:1906.11238,
24. *Multi-wavelength torus-jet model for Sagittarius A**, Vincent, F., Abramowicz, M., Zdziarski, A., **Wielgus, M.**, Paumard, T., Perrin, G., Straub, O., A&A 624, A52 (2019), arXiv:1902.01175,
23. *The Size, Shape, and Scattering of Sagittarius A* at 86 GHz: First VLBI with ALMA*, Issaoun, S., Johnson, M., Blackburn, L., + 41 authors, ApJ 871, 30 (2019), arXiv:1901.06226,
22. *Collisions of Neutron Stars with Primordial Black Holes as Fast Radio Bursts Engines*, Abramowicz, M., Bejger, M., **Wielgus, M.**, ApJ 868, 17 (2018), arXiv:1704.05931,
21. *Double Compton and Cyclo-Synchrotron in Super-Eddington Discs, Magnetized Coronae, and Jets*, McKinney, J. C., Chluba, J., **Wielgus, M.**, Narayan, R., Sądowski, A., MNRAS 467, 2241 (2017), arXiv:1608.08627,
20. *Radiative, two-temperature simulations of low-luminosity black hole accretion flows in general relativity*, Sądowski, A., **Wielgus, M.**, Narayan, R., Abarca, D., McKinney, J. C., Chael, A., MNRAS 466, 705 (2017), arXiv:1605.03184,
19. *Levitating atmospheres of Eddington-luminosity neutron stars*, **Wielgus, M.**, Sądowski, A., Kluźniak, W., Abramowicz, M., Narayan, R., MNRAS, 458, 3420 (2016), arXiv:1512.00094,
18. *Limits on thickness and efficiency of Polish doughnuts in application to the ULX sources*, **Wielgus, M.**, Yan, W., Lasota, J.-P., Abramowicz, M., A&A 587, A38 (2016), arXiv:1512.00749,
17. *Stable, levitating, optically thin atmospheres of Eddington-luminosity neutron stars*, **Wielgus, M.**, Kluźniak, W., Sądowski, A., Narayan, R., Abramowicz, M., MNRAS 454, 3766 (2015), arXiv:1505.06099,
16. *Two-frame tilt-shift error estimation and phase demodulation algorithm*, **Wielgus, M.**, Sunderland, Z., Patorski, K., Optics Letters 40, 3460 (2015),
15. *Local stability of strongly magnetized black hole tori*, **Wielgus, M.**, Fragile, P. C., Wang, Z., Wilson, J., MNRAS 447, 3593 (2015), arXiv:1412.4561,
14. *Cosmic background radiation in the vicinity of a Schwarzschild black hole: no classic firewall*, **Wielgus, M.**, Ellis, G. F. R., Vincent F., Abramowicz, M., PRD 90, 124024 (2014), arXiv:1406.6551,
13. *Continuous phase estimation from noisy fringe patterns based on the implicit smoothing splines*, **Wielgus, M.**, Patorski, K., Etchepareborda, P., Federico, A., Optics Express 22, 10775 (2014),

12. *Denoising and extracting background from fringe patterns using midpoint-based bidimensional empirical mode decomposition*, **Wielgus, M.**, Patorski, K., *Applied Optics* 53, B215 (2014),
11. *The perihelion of Mercury advance and the light bending calculated in (enhanced) Newton's theory*, Abramowicz, M., Ellis, G. F. R., Horák, J., **Wielgus, M.**, *General Relativity and Gravitation* 46:1630 (2014), arXiv:1303.5453,
10. *Nanocoral ZnO films fabricated on flexible poly(vinyl chloride) using a carrier substrate*, Borysiewicz, M., Wojciechowski, T., Dynowska, E., **Wielgus, M.**, Bar, J., Wojtowicz, T., Kamińska, E., Piotrowska, A., *Thin Solid Films* 550, 145 (2014),
9. *Advanced processing of optical fringe patterns by automated selective reconstruction and enhanced fast empirical mode decomposition*, Trusiak, M., **Wielgus, M.**, Patorski, K., *Optics and Lasers in Engineering* 52, 230 (2014),
8. *Escape, capture, and levitation of matter in Eddington outbursts*, Stahl, A., Kluźniak, W., **Wielgus, M.**, Abramowicz, M., *A&A* 555, A114 (2013), arXiv:1306.6556,
7. *AFM nanomoiré technique with phase multiplication*, Patorski, K., **Wielgus, M.**, Ekielski, M., Kaźmierczak, P., *Measurement Science and Technology* 24, 035402 (2013),
6. *Adaptive enhancement of optical fringe patterns by selective reconstruction using FABEMD algorithm and Hilbert spiral transform*, Trusiak, M., Patorski, K., **Wielgus, M.**, *Optics Express* 20, 23463 (2012),
5. *Oscillations of the Eddington capture sphere*, **Wielgus, M.**, Stahl, A., Abramowicz, M., Kluźniak, W., *A&A* 545, A123 (2012), arXiv:1208.2939,
4. *Eddington capture sphere around luminous stars*, Stahl A., **Wielgus, M.**, Abramowicz, M., Kluźniak, W., Yu, W., *A&A* 546, A54 (2012), arXiv:1208.2231,
3. *From porous to dense thin ZnO films through reactive DC sputter deposition onto Si (100) substrates*, Borysiewicz, M., Dynowska, E., Kolkovsky, V., Dyczewski, J., **Wielgus, M.**, Kamińska, E., Piotrowska, A., *Physica Status Solidi A* 209, 2463 (2012),
2. *Stability of radiation-pressure dominated disks. I. The dispersion relation for a delayed heating α -viscosity prescription*, Ciesielski, A., **Wielgus, M.**, Kluźniak, W., Sąkowski, A., Abramowicz, M., Lasota, J.-P., Rebusco, P., *A&A* 538, A148 (2012), arXiv:1106.2335,
1. *Evaluation of amplitude encoded fringe patterns using the bidimensional empirical mode decomposition and the 2D Hilbert transform generalizations*, **Wielgus, M.**, Patorski K., *Applied Optics* 50, 5513 (2011),

Other publications

30. *First M87 Event Horizon Telescope Results and the Role of ALMA*, Goddi, C., Crew, G., Impellizzeri, V., + 42 authors, *The Messenger* 177, 25 (2019), arXiv:1910.10193,
29. *Studying black holes on horizon scales with space-VLBI*, Johnson, M., + 27 authors, *Astro2020 white paper*, arXiv:1909.01405,
28. *Extremely long baseline interferometry with Origins Space Telescope*, Pesce, D., Haworth, K., Melnick, G., Blackburn, L., **Wielgus, M.**, + 6 authors, *Astro2020 white paper*, arXiv:1909.01408,
27. *Studying Black Holes on Horizon Scales with VLBI Ground Arrays*, Blackburn, L., + 37 authors, *Astro2020 white paper*, arXiv:1909.01411,
26. *Black Hole Physics on Horizon Scales* Doeleman, S., + 15 authors, *Astro2020 white paper*, *BAAS*, 51, 537 (2019),
25. *Global calibration of instrumental polarimetric phase gains*, Steel, S., **Wielgus, M.**, Blackburn, L., Issaoun, S., Johnson, M., *EHT Memo Series*, 2019-CE-03 (2019),
24. *EHT data set validation and characterization of errors*, **Wielgus, M.**, Blackburn, L., Issaoun, S., Janssen, M., Johnson, M., Koay, J.-Y., *EHT Memo Series*, 2019-CE-02 (2019),
23. *Flux Density Calibration of the EHT Array*, Janssen, M., Blackburn, L., Issaoun, S., Krichbaum, T., **Wielgus, M.**, *EHT Memo Series*, 2019-CE-01 (2019),
22. *The electromagnetic afterglows of gravitational waves as a test for Quantum Gravity*, Abramowicz, M., Bulik, T., Ellis, G. F. R., Meissner, K., **Wielgus, M.**, (2016), arXiv:1603.07830,
21. *Eddington capture sphere around luminous relativistic stars*, **Wielgus M.**, *Proceedings IAU* 312, 131, Beijing, China (2014),

20. *Stress-energy tensor of a radiating sphere inclosing black hole*, **Wielgus M.**, Abramowicz M., Proceedings of RAGtime 14-16, 293 (2014), arXiv:1501.01540,
19. *Evaluation of the implicit smoothing splines algorithm for the interferometric fringe pattern phase retrieval*, **Wielgus M.**, Patorski, K., Proc. SPIE 944112 (2014),
18. *Evaluation of optical parameters of quasi-parallel plates with single-frame interferogram analysis methods and eliminating the influence of camera parasitic fringes*, Sunderland, Z., Patorski, K., **Wielgus, M.**, Pokorski, K., Proc. SPIE 944111 (2014),
17. *Hilbert-Huang processing and analysis of complex fringe patterns*, Trusiak, M., Patorski, K., **Wielgus, M.**, Proc. SPIE 92030K-15 (2014),
16. *Fast adaptive processing of low quality fringe patterns by automated selective reconstruction and enhanced fast empirical mode decomposition*, Trusiak, M., Patorski, K., **Wielgus, M.**, Fringe 2013, 185, Stuttgart, Germany (2014),
15. *Filtering ESPI fringes with non-local means algorithm*, **Wielgus M.**, Patorski K., Fringe 2013, 317, Stuttgart, Germany (2014),
14. *Denoising and extracting background from fringe patterns using midpoint-based bidimensional empirical mode decomposition*, **Wielgus, M.**, Patorski, K., Proc. SPIE 90660K-9 (2013),
13. *Nanocrystalline thin films statistical structural analysis by the automatic image processing*, **Wielgus, M.**, Sunderland, Z., Koguciuk, D., Patorski, K., Słowik, G., Proc. SPIE 89234S-7 (2013),
12. *Enhanced measurements of displacements and strains in quasiperiodic nanostructures*, **Wielgus, M.**, + 4 authors, MRS Proceedings 1554, mrs13-1554-u04-07 (2013),
11. *Filtering fringe patterns with the extended non local means algorithm*, **Wielgus, M.**, Patorski, K., PHOTOPTICS 2013, Barcelona, Spain (2013),
10. *Sputter deposited ZnO porous films for sensing applications*, Borysiewicz, M., Dynowska, E., Kolkovsky, V., **Wielgus, M.**, + 6 authors, MRS Proceedings 1494, mrsf12-1494-z04-38 (2013),
9. *Comparative analysis of image fusion performance evaluation methods for the real-time environment monitoring system*, **Wielgus, M.**, Putz, B., Image Processing and Communications Challenges 4, Advances in Intelligent Systems and Computing 184, 119 (2012),
8. *Real-time Image Fusion Monitoring System: Problems and Solutions*, Putz, B., Bartyś, M., Antoniewicz, A., Klimaszewski, J., Kondej, M., **Wielgus, M.**, Image Processing and Communications Challenges 4, Advances in Intelligent Systems and Computing 184, 143 (2012),
7. *Continuous wavelet transform for d-space distribution analysis in nanocrystalline materials*, **Wielgus, M.**, Grochowski, J., Kamińska, E., Patorski, K., Proc. SPIE 84110A-6, (2012),
6. *Fast and Adaptive Bidimensional Empirical Mode Decomposition for the Real-time Video Fusion*, **Wielgus, M.**, Bartyś, M., Antoniewicz, A., Putz, B., Proc. IEEE 15th International Conference on Information Fusion, 649, Singapore (2012),
5. *Non-local fringe image filtration: a new interferometric data filtration paradigm?*, **Wielgus M.**, Patorski K., Photonics Letters of Poland, 4, 66 (2012),
4. *Multispectral phase shifting interferometry algorithm*, Wengierow, M., Sałbut, L., **Wielgus, M.**, Photonics Letters of Poland 4, 60 (2012),
3. *Amplitude demodulation of interferometric signals with a 2D Hilbert transform*, **Wielgus M.**, Challenges of modern technology 2, 8 (2011),
2. *Information retrieval from amplitude modulated fringe patterns using single frame processing methods*, Patorski, K., Pokorski, K. **Wielgus, M.**, Proc. SPIE 8338, 833802 (2011),
1. *Perona-Malik equation and its numerical properties*, **Wielgus, M.**, Bachelor thesis at the Faculty of Mathematics, Informatics and Mechanics, University of Warsaw (2010), arXiv:1412.6291