

# Maciek Wielgus

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## EDUCATION

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<b>Warsaw University of Technology</b> <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
<b>Warsaw University of Technology</b> <i>M.S. in Robotics and Automatic Control: Photonic Engineering (interferometric pattern analysis)</i>	Dec 2010
<b>Warsaw University</b> <i>B.S. in Mathematics: Numerical Analysis (partial differential equations)</i>	Sep 2010

## PROFESSIONAL EXPERIENCE

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<b>Postdoctoral Researcher</b> <i>Max Planck Institute for Radio Astronomy, Bonn, Germany</i>	Oct 2021 – present
<b>Visiting Researcher</b> <i>Paris Observatory Scientific Council grant, Meudon, France (reference: Frederic Vincent)</i>	Jul 2022
<b>Black Hole Initiative Postdoctoral Fellow</b> <i>Harvard University, Cambridge, USA (mentor: Shep Doeleman)</i>	May 2017 – Aug 2021
<b>Confronting Theories of Accretion with Observations, KITP Program</b> <i>Visiting Scholar, UCSB, Santa Barbara, USA</i>	Jan 2017 – Mar 2017
<b>Postdoctoral researcher at Nicolaus Copernicus Astronomical Center</b> <i>Polish Academy of Sciences, Warsaw, Poland (mentors: Wlodek Kluźniak, Marek Abramowicz)</i>	Jan 2017 – May 2017
<b>Internship at Center for Astrophysics   Harvard &amp; Smithsonian</b> <i>Cambridge, USA (mentors: Ramesh Narayan, Olek Sądowski)</i>	Oct 2015 – Dec 2015
<b>Visiting Scholar at Kavli Institute for Theoretical Physics, UCSB</b> <i>Santa Barbara, USA (mentors: Omer Blaes, Wlodek Kluźniak)</i>	Jun 2015
<b>Visiting Scholar at Peking University Kavli Institute for Astronomy and Astrophysics</b> <i>Beijing, China (mentors: Marek Abramowicz, Fukun Liu)</i>	Aug 2014
<b>Visiting Scholar at University of Capetown</b> <i>Capetown, South Africa (mentor: George F. R. Ellis)</i>	May 2014
<b>Internship at National Center of the Industrial Technology</b> <i>Buenos Aires, Argentina (mentors: Guillermo Kaufmann, Alejandro Frederico)</i>	Oct 2013 – Nov 2013
<b>Internship at Center for Astrophysics   Harvard &amp; Smithsonian</b> <i>Cambridge, USA (mentors: Ramesh Narayan, Olek Sądowski)</i>	Jun 2013 – Aug 2013
<b>Internship at the College of Charleston</b> <i>Charleston, USA (mentor: Chris Fragile)</i>	May 2013 – Jun 2013
<b>Engineer at the Institute of Electron Technology</b> <i>Warsaw, Poland</i>	2011 – 2013

## RESEARCH INTERESTS

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- 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

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EHT Early Career Award (individual)	2020, 2021, and 2022
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

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82 reviewed scientific journal papers (17 as a first author). 108 items **listed on ADS** (25 as a first author). 7562 citations, h-index=33, 64 papers cited at least 10 times (ADS, November 2022). Complete list of papers appended.

## TALKS

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I have given well over 100 professional talks and many outreach talks. A separate incomplete list can be found **on my website**. Below 10 recent talks that I am particularly happy with.

<i>Observing hot spots orbiting Sagittarius A* with ALMA and Chandra</i> Chandra X-ray Space Telescope Operations Control Center, Burlington, USA (invited)	Nov 2022
<i>Seeing the invisible: Imaging the supermassive black hole in the center of our Galaxy</i> 31st Texas Symp. on Relat. Astrophysics, Prague, Czechia (invited public outreach talk)	Sep 2022
<i>First image of the black hole shadow in Sagittarius A*</i> Paris Observatory, France (invited seminar)	Jul 2022

<b>First image of the black hole shadow in Sagittarius A*</b> KIPAC seminar, Stanford University (invited)	Jun 2022
<b>Variability of the Sagittarius A* millimeter light curves</b> 5th Black Hole Initiative Conference, Harvard University (invited)	May 2022
<b>Observing AGN sources with the EHT</b> AGN Seminar at NASA Goddard Space Flight Center, USA (invited)	Feb 2022
<b>Would we know a wormhole if we saw one?</b> 16th Marcel Grossmann Meeting (invited)	Jul 2021
<b>Shadows of the past, shadows of the future</b> 16th Marcel Grossmann Meeting (invited)	Jul 2021
<b>Resolving the polarized emission from the core of the M87 galaxy with the EHT</b> Los Alamos National Lab., Center for Theoretical Astrophysics, USA (invited seminar)	May 2021
<b>Polarized emission around the M87 supermassive black hole</b> SLAC seminar, Stanford University (invited)	Mar 2021

## GRANTS AND FORMAL PROJECTS

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

## TEACHING EXPERIENCE

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

## OTHER ACTIVITIES

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- o leading the EHT Time Domain Working Group 2018-2022
- o EHT Early Career Award 2020 "for his role and contributions to data processing, validation, and analysis of the 2017 EHT data, leading to the results published in the first six papers of the EHT"

- EHT Early Career Award 2021 "for his demonstration of the persistence of the M87 ring using years of historical EHT data"
- EHT Early Career Award 2022 "for his contribution to the calibration, analysis and interpretation of the EHT results of Sgr A\*, and his leadership in the analysis and calibration of the ALMA data"
- one of the key contributors to the EHT data set reduction and inspection pipeline development
- paper coordinator for the collaboration paper EHTC, ApJL 875 L3 (2019)
- reviewer for MNRAS, A&A, ApJ, PRL, New Astronomy, Applied Optics, Optics Express, Optics Letters
- SOC member for EHT polarization workshop, Max-Planck Institute for Radio Astronomy, July 2019 and EHT Collaboration Meeting, Granada, June 2022
- 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
- active popularizator of astronomy

## LANGUAGES

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- **Polish** [fluent]
- **English** [fluent]