

# Ronaldas Macas

MacasR@cardiff.ac.uk

## QUALIFICATIONS

**Cardiff University**, Cardiff, Wales, UK

PhD., Gravitational Physics, expected 2020

- Thesis title: “Detection, Reconstruction and Interpretation of Gravitational-Wave Bursts”

**University of Glasgow**, Glasgow, Scotland, UK

MSci., Physics and Astronomy, 2010-2016

- First class degree
- Thesis title: “Investigating an Alternative to Dark Matter: Timescape Cosmology”

## PROFESSIONAL EXPERIENCE

*Cardiff University, Cardiff, UK*

- Gravitational-Wave Burst Signal Interpretation 2016+
- Search for Gravitational-Wave Signals Associated with Gamma-ray Bursts 2016+
- Bayesian Inference Analysis of Unmodelled Gravitational-Wave Transients 2014–2019

*University of Glasgow, Glasgow, UK*

- Galaxy Catalogue for Multi-Messenger Search with Advanced LIGO and Virgo 2014-2018

*LIGO Hanford Observatory, Hanford, WA, USA*

- LIGO Fellowship on Live Noise Budget at Hanford Observatory 2018 March–July

*Albert Einstein Institute, Hannover, Germany*

- Search Parameters for Continuous Gravitational-wave Algorithm StackSlide 2015 June–August

## INVITED RESEARCH VISITS

*June 2018: Penn State University, University Park, PA, USA*

*February 2020: University of Glasgow, Glasgow, Scotland, UK*

## SCIENTIFIC TALKS AND PRESENTATIONS

*July 2019: Amaldi/GR22, Valencia, Spain*

“Search for Gravitational Waves Associated with Gamma-Ray Bursts During the Second Advanced LIGO-Virgo Observing Run”

*July 2019: Amaldi/GR22, Valencia, Spain*

“Unmodeled Source Reconstruction with Gravitational Waves”

*July 2019: National Astronomy Meeting, Lancaster, UK*

“Search for Gravitational Waves Associated with Gamma-Ray Bursts During the Second Advanced LIGO-Virgo Observing Run”

*June 2018: Invited seminar talk at the Institute for Gravitation and the Cosmos, Penn State University, PA, USA*

“Gravitational-wave Bursts: Searching for the Unknown”

*May 2018: LIGO Washington Meeting, Hanford, WA, USA*

“Live Noise Budget”

*July 2017: National Astronomy Meeting, Hull, UK*

“Gravitational Wave Search Using Gamma-ray Bursts with Advanced LIGO”

*July 2017-September 2019: numerous talks at LIGO-Virgo collaboration meetings*

### **PARTICIPATION IN SCHOOLS, WORKSHOPS AND CONFERENCES**

*July 2019: Summer School on Neutron Star Modeling, Southampton, UK*

*August 2017: Summer School on Gravitational Wave Astronomy, St Andrews, UK*

*September 2019: Workshop “The Astrophysical Implications of Gravitational Wave Detections”, Warsaw, Poland*

*March 2018: Workshop “First Multi-Messenger Observations of a Neutron Star Merger and its Implications for Nuclear Physics”, Seattle, WA, USA*

*September 2019: LIGO-Virgo-KAGRA meeting, Warsaw, Poland*

*September 2018: LIGO-Virgo meeting, Maastricht, Netherlands*

*May 2018: BayesWave F2F meeting, Huntsville, AL, USA*

*March 2018: LIGO-Virgo meeting, Sonoma, CA, USA*

*September 2017: LIGO-Virgo meeting, Geneva, Switzerland*

*April 2017: BritGrav, Oxford, UK*

*September 2016: LIGO-Virgo meeting, Glasgow, UK*

### **GRANTS AND FUNDING**

*May 2017: Long Term Attachment Grant for the LIGO Fellows Program, STFC. Support for 4-month research visit to LIGO Hanford observatory. £4,851*

*March 2018: Support to attend INT-JINA Symposium “First Multi-messenger Observations of a Neutron Star Merger and its Implications for Nuclear Physics”, RAS, £700*

*September 2017: Support to attend LIGO-Virgo meeting in Geneva, Switzerland, IoP, £150*

### **TECHNICAL SKILLS**

Computer Programming: Matlab, Python, Bash Shell Scripting, LINUX, git

Computer Applications: L<sup>A</sup>T<sub>E</sub>X, vi

## MARKING AND DEMONSTRATING

2016-19: PX4128 Data Analysis

2018-19: PX3143 Computational Physics

2016-17: PX3241 Particle Physics and Special Relativity

## PUBLIC OUTREACH

GW170817-GRB 170817A announcement:

- News article for STEM public outreach website ([link](#), only in Lithuanian)
- Radio interview ([link](#), only in Lithuanian)

## VOLUNTEERING

Detector Characterisation (DQ) shifts for the LIGO-Virgo Observing run 3

Cardiff University Men's Basketball Club President 2018–2019

## SELECTED PUBLICATIONS

I have authored or co-authored 40+ papers in total,  $h$ -index = 23. As a member of LIGO, I am a co-author on the major discovery papers released since 2017. I highlight here 5 papers to which I have directly contributed.

1. B. P. Abbott et al. Search for Gravitational-wave Signals Associated with Gamma-ray Bursts During the Second Observing Run of Advanced LIGO and Advanced Virgo. 2019. *Astrophysics J.*, 886(1):75, Nov 2019
2. F. Pannarale, R. Macas, and P. J. Sutton. Bayesian Inference Analysis of Unmodelled Gravitational-wave Transients. *Classical and Quantum Gravity*, 36(3):035011, Feb 2019
3. G. Dalya, G. Galgazi, L. Dobos, Z. Frei, I. S. Heng, R. Macas, C. Messenger, P. Raffai, and R. S. deSouza. GLADE: A Galaxy Catalogue for Multimessenger Searches in the Advanced Gravitational-wave Detector Era. *Monthly Notices of the Royal Astronomical Society*, 479(2):2374–2381, Jun 2018.
4. B. P. Abbott et al. Gravitational Waves and Gamma-rays from a Binary Neutron Star Merger: GW170817 and GRB 170817A. *Astrophys. J.*, 848(2):L13, Oct 2017.
5. M. Tse et al. The Quantum-enhanced Advanced LIGO Detectors in the Era of Gravitational-wave Astronomy. *Phys Review Letters*, 123(23):231107, Dec 2019

## OTHER PUBLICATIONS

- [1] B.P. Abbott et al. Search for Gravitational Waves from a Long-lived Remnant of the Binary Neutron Star Merger GW170817. *The Astrophysical Journal*, 875(2):160, Apr 2019.

- [2] B. P. Abbott et al. Search for intermediate mass black hole binaries in the first and second observing runs of the Advanced LIGO and Virgo network. *Phys. Rev.*, D100(6):064064, 2019.
- [3] B. P. Abbott et al. Search for the isotropic stochastic background using data from Advanced LIGO’s second observing run. *Phys. Rev.*, D100(6):061101, 2019.
- [4] Abbott et al. Directional Limits on Persistent Gravitational Waves using Data from Advanced LIGOs First Two Observing Runs. *Phys. Rev. D*, 100:062001, Sep 2019.
- [5] B. P. Abbott et al. . GW170817: Implications for the Stochastic Gravitational-Wave Background from Compact Binary Coalescences. *Phys. Rev. Lett.*, 120:091101, Feb 2018.
- [6] B. P. Abbott et al. Estimating the Contribution of Dynamical Ejecta in the Kilonova Associated with GW170817. *The Astrophysical Journal*, 850(2):L39, Dec 2017.
- [7] B. P. Abbott et al. First Narrow-band Search for Continuous Gravitational Waves from Known Pulsars in Advanced Detector Data. *Phys. Rev. D*, 96:122006, Dec 2017.
- [8] B. P. Abbott et al. GW170608: Observation of a 19 Solar-mass Binary Black Hole Coalescence. *The Astrophysical Journal*, 851(2):L35, Dec 2017.
- [9] B. P. Abbott et al. GW170814: A Three-Detector Observation of Gravitational Waves from a Binary Black Hole Coalescence. *Phys. Rev. Lett.*, 119:141101, Oct 2017.
- [10] B. P. Abbott et al. GW170817: Observation of Gravitational Waves from a Binary Neutron Star Inspiral. *Phys. Rev. Lett.*, 119:161101, Oct 2017.
- [11] B. P. Abbott et al. Multi-messenger Observations of a Binary Neutron Star Merger. *The Astrophysical Journal*, 848(2):L12, Oct 2017.
- [12] B. P. Abbott et al. On the Progenitor of Binary Neutron Star Merger GW170817. *The Astrophysical Journal*, 850(2):L40, Dec 2017.
- [13] B. P. Abbott et al. Search for High-energy Neutrinos from Binary Neutron Star Merger GW170817 with ANTARES, IceCube, and the Pierre Auger Observatory. *The Astrophysical Journal*, 850(2):L35, Nov 2017.
- [14] B. P. Abbott et al. Search for Post-merger Gravitational Waves from the Remnant of the Binary Neutron Star Merger GW170817. *The Astrophysical Journal*, 851(1):L16, Dec 2017.
- [15] B. P. Abbott et al. Search for Subsolar-Mass Ultracompact Binaries in Advanced LIGO’s First Observing Run. *Phys. Rev. Lett.*, 121:231103, Dec 2018.
- [16] B. P. Abbott et al. Search for Tensor, Vector, and Scalar Polarizations in the Stochastic Gravitational-Wave Background. *Phys. Rev. Lett.*, 120:201102, May 2018.
- [17] B. P. Abbott et al. A Fermi Gamma-Ray Burst Monitor Search for Electromagnetic Signals Coincident with Gravitational-wave Candidates in Advanced LIGO’s First Observing Run. *The Astrophysical Journal*, 871(1):90, Jan 2019.
- [18] B. P. Abbott et al. All-sky Search for Continuous Gravitational Waves from Isolated Neutron Stars using Advanced LIGO O2 Data. *Phys. Rev. D*, 100:024004, Jul 2019.
- [19] B. P. Abbott et al. All-sky Search for Long-duration Gravitational-wave Transients in the Second Advanced LIGO Observing Run. *Phys. Rev. D*, 99:104033, May 2019.
- [20] B. P. Abbott et al. Binary Black Hole Population Properties Inferred from the First and Second Observing Runs of Advanced LIGO and Advanced Virgo. *The Astrophysical Journal*, 882(2):L24, Sep 2019.
- [21] B. P. Abbott et al. Constraining the  $p$ -Mode– $g$ -Mode Tidal Instability with GW170817. *Phys. Rev. Lett.*, 122:061104, Feb 2019.
- [22] B. P. Abbott et al. Low-latency Gravitational-wave Alerts for Multimessenger Astronomy during the Second Advanced LIGO and Virgo Observing Run. *The Astrophysical Journal*, 875(2):161, Apr 2019.
- [23] B. P. Abbott et al. Narrow-band Search for Gravitational Waves from Known Pulsars using the Second LIGO Observing Run. *Phys. Rev. D*, 99:122002, Jun 2019.

- [24] B. P. Abbott et al. Properties of the Binary Neutron Star Merger GW170817. *Phys. Rev. X*, 9:011001, Jan 2019.
- [25] B. P. Abbott et al. Search for Multimessenger Sources of Gravitational Waves and High-energy Neutrinos with Advanced LIGO during Its First Observing Run, ANTARES, and IceCube. *The Astrophysical Journal*, 870(2):134, Jan 2019.
- [26] B. P. Abbott et al. Search for Transient Gravitational-wave Signals Associated with Magnetar Bursts during Advanced LIGO’s Second Observing Run. *The Astrophysical Journal*, 874(2):163, Apr 2019.
- [27] B. P. Abbott et al. Searches for Continuous Gravitational Waves from 15 Supernova Remnants and Fomalhaut b with Advanced LIGO. *The Astrophysical Journal*, 875(2):122, Apr 2019.
- [28] B. P. Abbott et al. Searches for Gravitational Waves from Known Pulsars at Two Harmonics in 2015–2017 LIGO Data. *The Astrophysical Journal*, 879(1):10, Jun 2019.
- [29] B. P. Abbott et al. Tests of General Relativity with GW170817. *Phys. Rev. Lett.*, 123:011102, Jul 2019.
- [30] B. P. Abbott et al. First Measurement of the Hubble Constant from a Dark Standard Siren using the Dark Energy Survey Galaxies and the LIGO/Virgo Binary–black-hole merger GW170814. *The Astrophysical Journal*, 876(1):L7, Apr 2019.
- [31] B.P. Abbott et al. A Gravitational-wave Standard Siren Measurement of the Hubble Constant. *Nature*, 551(7678):85–88, Nov 2017.
- [32] B.P. Abbott et al. Full Band All-sky Search for Periodic Gravitational Waves in the o1 LIGO Data. *Phys. Rev. D*, 97:102003, May 2018.
- [33] B.P. Abbott et al. GW170817: Measurements of Neutron Star Radii and Equation of State. *Phys. Rev. Lett.*, 121:161101, Oct 2018.
- [34] B.P. Abbott et al. A Standard Siren Measurement of the Hubble Constant from GW170817 without the Electromagnetic Counterpart. *The Astrophysical Journal*, 871(1):L13, Jan 2019.
- [35] B.P. Abbott et al. All-sky Search for Short Gravitational-wave Bursts in the Second Advanced LIGO and Advanced Virgo Run. *Phys. Rev. D*, 100:024017, Jul 2019.
- [36] B.P. Abbott et al. GWTC-1: A Gravitational-Wave Transient Catalog of Compact Binary Mergers Observed by LIGO and Virgo during the First and Second Observing Runs. *Phys. Rev. X*, 9:031040, Sep 2019.