FLATIRON INSTITUTE

CHIARA M. F. MINGARELLI, PHD

cmingarelli@flatironinstitute.org
www.chiaramingarelli.com

Center for Computational Astrophysics,
Flatiron Institute
162 Fifth Ave,
New York, NY 10010

+1 (626) 487-3219

Education

University of Birmingham, Birmingham, UK — PhD, 2014
University of Bologna, Bologna, Italy — M.Sc., 2009
Carleton University, Ottawa, Canada — B.Sc (Double Honours), 2006

Postdoc Experience

Flatiron Research Fellow 2017 - present

I am currently a Flatiron Research Fellow at the Center for Computational Astrophysics (part of the Simons Foundation) in New York.

Marie Curie International Outgoing Fellow — 2014 - 2017

I spent the outgoing phase of the MC IOF postdoctoral fellowship at Caltech, with visiting status at NASA's Jet Propulsion Laboratory, with the European reintegration phase at the Max Planck Institute for Radio Astronomy in Bonn, Germany.

Teaching Experience

Guest Lecturer, Caltech and NYU

I was invited to lecture for graduate classes PHYS-GA 2060, General Relativity at NYU (taught by Yacine Ali-Haïmoud) and Ph237, Gravitational Waves (taught by Yanbei Chen) at Caltech. Moreover, I lectured on Pulsar Timing Arrays at the 2015 Caltech Gravitational-Wave Astrophysics School. I also developed and taught an undergraduate calculus class called "Math Matters" at Carleton University (Ottawa, Canada), which I taught over the summer from 2010 to 2013.

Invited Talks

I have given 34 invited talks at world-class research institutes such as Caltech, Princeton, Harvard, and NASA Headquarters. Dates and locations are in my CV.

Referee and Service Work

I am currently a referee for Physical Review Letters, Physical Review D, Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Classical and Quantum Gravity. I was also an NSF Astronomy grant panelist (2016).

Code Sharing for the Scientific Community

Since 2015, I have made all codes used to generate published results public via my github account, https://github.com/ChiaraMingarelli. I also share lecture notes there, and practical exercises with solutions for introduction to gravitational wave courses. I work primarily in Python and publish my codes with Jupyter notebooks.

Selection of Recent Prizes, Honors and Awards

Marie Curie International Outgoing Fellowship — 2014 - 2017

Project name “GW ASAP”, Proposal number 623380, value €262,975.

Marie Curie Actions “Communicating Science” Prize — 2017

I won the Marie Curie Actions “Communicating Science” Prize for 2017, presented at the MCA Presidency Meeting in Malta, May 2017.

American Physical Society — 2016

Woman Physicist of the Month, November 2016

Springer Thesis Award — 2015

Thesis published by Springer Theses with $650 cash prize

Public Engagement in Science

Selection of Television Appearances and Podcasts:

How the Universe Works, Science Channel, Season 5; Amy Poehler Smart Girls: Experimenting with Megan Amram, Episode 5; Talk Nerdy with Cara Santa Maria, Episode 70; Story Collider podcast, “How I Ended Up At the Center of the Universe”

Popular Science Articles

Scientific American, “Searching for the Gravitational Waves LIGO Can't Hear”, by Chiara Mingarelli, 2016; Amy Poehler Smart Girls, “Conversations with a Theoretical Astrophysicist”, invited blog series for Women’s Month 2016

High Profile Public Lectures

Amazon MARS, Palm Springs; Dreamworks Animation, Los Angeles, CA, USA; Ad Astra Academy, Bel Air, CA; Adler Planetarium, “Adler After Dark”, Chicago, IL, USA.

Bibliography

Monographs

- **C. M. F. Mingarelli**, Gravitational Wave Astrophysics with Pulsar Timing Arrays, Springer Thesis Series 2016, ISBN 978-3-319-18400-5.

Articles

- **C. M. F. Mingarelli** and A. B. Mingarelli, Proving the short-wavelength approximation used in pulsar timing array gravitational-wave background searches, arXiv:1806.06979 (2018).
- Z. Arzoumanian et al., The NANOGrav 11-year Data Set: High-precision Timing of 45 Millisecond Pulsars, ApJ S, Volume 235, Issue 2, article id. 37, (2018).
- Z. Arzoumanian et al., The NANOGrav 11-year Data Set: Pulsar-timing Constraints On The Stochastic Gravitational-wave Background, arXiv:1801.02617

- **C. M. F. Mingarelli**, T. J. W. Lazio, A. Sesana et al., Detection Prospects of Local Continuous Nanohertz Gravitational-Wave Sources with Pulsar Timing Arrays, Nature Astronomy, Volume 1, pages 886–892 (2017)[1].
- Z. Arzoumanian et al., The NANOGrav Nine-year Data Set: Limits on the Isotropic Stochastic Gravitational Wave Background, ApJ 821, Issue 1,13, (2016).
- P. Lasky, **C. M. F. Mingarelli**, T. Smith et al., Gravitational-wave cosmology across 29 decades in frequency, Phys. Rev. X, Vol 6, Issue 1, 011035 (2016)[2].
- S. R. Taylor, M. Vallisneri, J. A. Ellis, **C. M. F. Mingarelli**, T. J. W. Lazio, R. van Haasteren, Are we there yet? Time to detection of nanohertz gravitational waves based on pulsar-timing array limits, ApJL, 819, L6 (2016).
- **C. M. F. Mingarelli** for NANOGrav, Interpreting the Recent Upper Limit on the Gravitational Wave Background from the Parkes Pulsar Timing Array; arXiv: 1602.06301 (2016).
- L. Lentati et al., From Spin Noise to Systematics: Stochastic Processes in the First International Pulsar Timing Array Data Release, MNRAS, Vol 458 (2016).
- G. Desvignes et al., High-precision timing of 42 millisecond pulsars with the European Pulsar Timing Array, MNRAS, Vol 458 (2016).
- J. P. W. Verbiest et al., The International Pulsar Timing Array: First Data Release, MNRAS, Vol 457 (2016).
- S. Babak et al., European Pulsar Timing Array limits on continuous gravitational waves from individual supermassive black hole binaries, MNRAS Vol 455 (2016).
- N. Caballero et al., The noise properties of 42 millisecond pulsars from the European Pulsar Timing Array and their impact on gravitational wave searches, MNRAS, Vol 457 (2016).
- **C. M. F. Mingarelli**, J. Levin, T. J. W. Lazio, Fast Radio Bursts and Radio Transients from Black Hole Batteries, ApJL 814, L20 (2015).
- J. D. Romano, S. R. Taylor, N. J. Cornish, J. Gair, **C. M. F. Mingarelli**, R. van Haasteren, Phase-coherent mapping of gravitational-wave backgrounds using ground-based laser interferometers, Phys. Rev. D 92, 042003 (2015).
- S. R. Taylor, **C. M. F. Mingarelli,** et al. Limits on anisotropy in the nanohertz stochastic gravitational-wave background Phys. Rev. Lett. 115, 041101 (2015).
- **C. M. F. Mingarelli**, T. Sidery. Effect of small interpulsar distance variations in stochastic gravitational wave background searches with Pulsar Timing Arrays, Phys. Rev. D 90, 062011 (2014)[3].

[1] Nature Astronomy commissioned a News & Views article to be written about the importance of this work, see L. Moustakas, Nature Astronomy Volume 1, 825–826 (2017)

[2] Highlighted in APS ``Physics". Synopsis: Homing in on Primordial Gravitational Waves

[3] Selected for APS Kaleidoscope

- J. R. Gair, J. D. Romano, S. R. Taylor, **C. M. F. Mingarelli**, Mapping gravitational-wave backgrounds using methods from CMB analysis: Application to pulsar timing arrays, Phys. Rev. D 90, 082001 (2014)[4].
- **C. M. F. Mingarelli**, T. Sidery, I. Mandel and A. Vecchio. Characterizing stochastic gravitational wave background anisotropy with Pulsar Timing Arrays. Phys. Rev. D 88, 062005 (2013).
- **C. M. F. Mingarelli**, K. Grover, T. Sidery, R. J. E. Smith, and A. Vecchio. Observing the Dynamics of Supermassive Black Hole Binaries with Pulsar Timing Arrays. Phys. Rev. Lett., 109 081104 (2012)[5].
- A. Y. Kamenshchik and **C. M. F. Mingarelli**, A generalized Heckmann-Schücking cosmological solution in the presence of a negative cosmological constant. Phys. Lett. B (693), 213 (2010).
- A. B. Mingarelli and **C. M. F. Mingarelli**,, Conjugate points in the gravitational n-body problem, Celest. Mech. Dynam. Astron. 91, 391 (2005).

Submitted work

- Z. Arzoumanian et al., The NANOGrav 11-year Data Set: Pulsar-timing Constraints On The Stochastic Gravitational-wave Background, arXiv:1801.02617. Submitted to ApJ.
- Z. Arzoumanian et al., The NANOGrav Eleven-year Data Set: High-precision timing of 45 Millisecond Pulsars, arXiv:1801.01837. Submitted to ApJ.

[4] Editor's Suggestion, PRD Highlights

[5] Highlighted in APS ``Physics". Synopsis: Sailing Choppy Gravitational Seas