Fruzsina Julia Agocs — Curriculum Vitae

Assistant Professor at the University of Colorado, Boulder, Department of Computer Science
fruzsina.agocs@colorado.edu fruzsinaagocs.github.io github.com/fruzsinaagocs
arXiv

Research interests

Numerical analysis
Numerical solution of PDEs
Boundary integral equations
Numerical solution of ODEs
High-order methods
Oscillatory problems
Wave propagation
Computational cosmology, physics
Open-source software

Education

Ph.D. Theoretical Cosmology, University of Cambridge, UK 2021
Advisor: Anthony Lasenby, Mike Hobson, Will Handley
Thesis: Primordial evolution of cosmological perturbations: Theory and computation

M.Sci. Theoretical and Experimental Physics, University of Cambridge, UK 2017
Advisor: Will Handley, First class
Dissertation: The Runge-Kutta-Wentzel-Kramers-Brillouin method and the primordial Universe

B.A. Natural Sciences, University of Cambridge, UK 2016
First class

Professional experience

Assistant Professor, Department of Computer Science, CU Boulder **Aug 2024–**

Flatiron Research Fellow, CCM, Flatiron Institute 2021–2024

Research student, British Antarctic Survey Jul 2019– Jan 2020
Forecasting Arctic sea ice extent with temporal convolutional networks
Advisor: Scott Hosking

Research Engineer, Kokoon Technology Ltd. Jul–Sept 2016 & Jul–Aug 2017
Sleep cycle classification based on single-channel EEG data

Research student, Institute of Astronomy, University of Cambridge Jun–Sept 2015
Correcting for host galaxy contamination in the spectral energy distribution of active galactic nuclei
Advisor: Ranjan Vasudevan

Publications

Refereed: 10 articles (6 first author)
Citations 121
h-index: 6
(as of *2025-1-31*)

Refereed

10 Ohana, R.; McCabe, M.; Meyer, L.; Morel, R.; **Agocs, F. J.** *et al.*, *The Well: a Large-Scale Collection of Diverse Physics Simulations for Machine Learning*, NeurIPS, 2024 (arXiv:2412.00568) [0 citations]

9 **Agocs, F. J.**; Barnett, A. H., *Trapped acoustic waves and raindrops: high-order accurate integral equation method for localized excitation of a periodic staircase*, Journal of Computational Physics, 2023 (arXiv:2310.12486) [2 citations]

8 Letey, M. I.; Shumaylov, Z.; **Agocs, F. J.**; Handley, W. J. *et al.*, *Quantum Initial Conditions for Curved Inflating Universes*, Physical Review D, 2024 (arXiv:2211.17248) [8 citations]

7 **Agocs, F. J.**; Barnett, A. H., *An adaptive spectral method for oscillatory second-order linear ODEs with frequency-independent cost*, SIAM Numerical Analysis, 2024 (arXiv:2212.06924) [7 citations]

6 **Agocs, F. J.**; Barnett, A., *riccati: an adaptive, spectral solver for oscillatory ODEs*, JOSS, 2023 [1 citation]

5 Hergt, L. T.; **Agocs, F. J.**; Handley, W. J.; Hobson, M. P. *et al.*, *Finite inflation in curved space*, Physical Review D, 2022 (arXiv:2205.07374) [22 citations]

4 AbdusSalam, S. S.; **Agocs, F. J.**; Allanach, B. C.; Athron, P. *et al.*, *Simple and statistically sound recommendations for analysing physical theories*, Reports on Progress in Physics, 2022 (arXiv:2012.09874) [26 citations]

3 **Agocs, F. J.**, *(py)oscode: fast solutions of oscillatory ODEs*, JOSS, 2020 [5 citations]

2 **Agocs, F. J.**; Hergt, L. T.; Handley, W. J.; Lasenby, A. N. *et al.*, *Quantum initial conditions for inflation and canonical invariance*, Physical Review D, 2020 (arXiv:2002.07042) [9 citations]

1 **Agocs, F. J.**; Handley, W. J.; Lasenby, A. N.; Hobson, M. P., *Efficient method for solving highly oscillatory ordinary differential equations with applications to physical systems*, Physical Review Research, 2020 (arXiv:1906.01421) [35 citations]

Preprints & other

1 **Agocs, F. J.**; Hobson, M. P.; Handley, W. J.; Lasenby, A. N., *Dense output for highly oscillatory numerical solutions*, Submitted to Physical Review Research, 2020 (arXiv:2007.05013) [4 citations]

Google scholar

Honors and awards

STFC funded PhD award	2017–2021
Duncan Bruce memorial prize for excellence in physics	2017
Senior scholarship for academic excellence	2016

Talks

Jul 2025, ICOSAHOM, Montreal (invited minisymposium)
Jun 2025, SDIDE 2025, Italy (invited talk)
Mar 2025, SIAM CSE (invited minisymposium)
Mar 2024, Harvard University (job talk)
Mar 2024, University of Colorado, Boulder (job talk)
Feb 2024, University of Maryland, Baltimore (job talk)
Jan 2024, University of Warwick, UK (job talk)
Nov 2023, University of Massachusetts Lowell (invited seminar)
Oct 2023, SIAM-NNP, Newark (minisymposium, organizer)
Oct 2023, Cornell (invited talk)
Aug 2023, ICIAM, Tokyo (contributed talk)
Aug 2023, ICOSAHOM, Seoul (minisymposium)
Apr 2023, NYU, New York (invited seminar)
Feb 2023, SIAM Computer Science and Engineering, Amsterdam (minisymposium, organizer)
Feb 2023, Yale (invited seminar)
Dec 2022, University of Innsbruck (invited seminar)
Oct 2022, Flatiron-wide algorithms and mathematics ($F_\omega(\alpha + m)!$), New York (lecture)
Oct 2022, University of Chicago (invited seminar)
Oct 2022, New Jersey Institute of Technology (invited seminar)
Sept 2022, Sayas numerics day, University of Maryland, BC (contributed talk)
Jun 2022, SDIDE, Budapest (invited speaker)
May 2022, BIRS-CMO workshop on "Outstanding challenges in computational methods for integral equations", virtual (invited speaker)
Jan 2021, CAM-LMU workshop, virtual (contributed talk)
Nov 2020, Numerical analysis seminar, Flatiron Institute, New York
July 2020, Beecroft Institute, University of Oxford (seminar)
July 2020, SciPy conference, virtual (contributed talk)
Apr 2020, Battcock Centre for Experimental Astrophysics, Cambridge (invited seminar)
Jan 2020, Institute of Astronomy, Cambridge (invited seminar)
Sept 2019, KICC10, Kavli Institute of Cosmology, Cambridge (contributed talk & poster)
Oct 2018, Kavli Institute of Cosmology, Cambridge (invited seminar)
Jul 2018, National CDT in data intensive science conference, London (poster)
Jun 2017, Battcock Centre for Experimental Astrophysics, Cambridge (invited seminar)

Open source development

Core developer and maintainer of riccaticpp riccati, oscode
Member of "core team" of GAMBIT

Teaching

2024

Fall: CSCI 7000-014 "Computational tools for multiscale problems"

Fall: PhD qualifying exam committee member for 2 students

Earlier

Tutorials in groups of 2-20, University of Cambridge:
2018–2019, 1st year Mathematics *(6 students, 56 hours total)*
2017–2019, 3rd year General Relativity *(11 students, 11 hours total)*
2017–2020, 4th year Relativistic Astrophysics and Cosmology *(50 students, 28 hours total)*

Mentorship

PhD

Riley Fisher 2025–

Masters

Sankalan Bhattacharyya (co-mentor with Will Handley) 2023, University of Cambridge
Applications of spectral collocation methods in cosmology simulations

Public outreach (selected)

2020, Public talk at the Open Evening of the Institute of Astronomy, Cambridge

2020, Astronomy lecture and observation session at Logikatábor, Hungary

2020, Interview for article on meteor showers

2020, Periscope broadcast at RWTH Aachen University

2018, Invited speaker at the Women in STEM residential, Gonville and Caius college

Service

Peer-review

Journal of Computational and Applied Mathematics

Journal of Open Source Software

SIAM Numerical Analysis

SciPy conference

Workshop and meeting organization

Oct 2023, SIAM regional meeting, minisymposium on "Advances in integral equations and quadrature methods, and their applications in computational physics"

Feb 2023, SIAM Computer Science and Engineering, minisymposium on "Software for integral equations and boundary element methods"

References

Alex Barnett, Center for Computational Mathematics, Flatiron Institute
Leslie Greengard, Center for Computational Mathematics, Flatiron Institute
Mike Hobson, University of Cambridge (UK)
Teaching: Marsha Berger, Center for Computational Mathematics, Flatiron Institute