

Matthieu Schaller

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Expertise

- Main developer of the next-generation cosmological code **SWIFT**.
- Core member (builder) of the **EAGLE** cosmological simulations suite team.
- Core member (builder) of the **APOSTLE** project attempting to simulate Local Group environments with the **EAGLE** code.
- Expertise in galaxy formation, effects of baryons on cosmological probe, local group challenges to the **CDM** paradigm, high-performance computing and hydrodynamical simulations.
- Member of the **C-EAGLE** project team attempting to simulate rich clusters with the **EAGLE** code.

Accademic positions

2018 – 2023 **Leiden Observatory**, Leiden, Netherlands, **VENI Post-Doctoral Research Fellow**.

2015 – 2017 **Institute for Computational Cosmology**, Durham, UK, **Research Associate**.

Education

2011 – 2015 **Institute for Computational Cosmology**, Durham, UK, **PhD in Astrophysics**.

- Research on the impact of baryons on Dark Matter structures using computer simulations under the supervision of Pr. Carlos Frenk, Pr. Richard Bower and Pr. Tom Theuns.
- Part of the development and analysis team of the **EAGLE** cosmological simulation project lead by Pr. Joop Schaye of Leiden University. Lead author of 6 of the 150 scientific publications.
- Research on fluid dynamic simulations and potential improvements of the **SPH** technique.
- Development of **SWIFT**, a new hybrid cosmological **SPH** code in collaboration with Dr. Pedro Gonnet. Already produced 4 scientific publications.
- Organisation and hosting of weekly science discussion sessions. Part of the organisation committee of an international conference.
- Development of software for public outreach activities.

2009 – 2011 **EPFL**, Lausanne, Switzerland, **Master of Science MSc in Applied Physics**.

- Obtained the highest grade for the master thesis “*A framework for numerical simulations of structure formation*” defended within the Particle Physics and Cosmology Laboratory under Pr. Mikhail Shaposhnikov’s supervision.
- Computational Physics Research to develop more efficient algorithms for N -body problems in the Astrophysics Laboratory
- Engineering internship on computational fluid dynamics (**SPH**) using GPUs at Andritz Hydro.
- Strong emphasize on theoretical and numerical physics.
- Graduated with a 5.8 out of 6, the best overall average among the physics students.

2008 – 2009 **Imperial College**, London, UK, **International Diploma in Physics**, Erasmus student.

- Obtained first class honours.
- Semester work on Infrared Galaxies in the Astrophysics Laboratory under the supervision of Dr. George Bendo.

2006 – 2009 **EPFL**, Lausanne, Switzerland, **Bachelor of Science BSc in Physics**.

- With the third year at Imperial College in London as an **ERASMUS** student.

Software

SWIFT A platform-independent, Open-Source library for multi-resolution cosmological Smoothed Particle Hydrodynamics (SPH) and N -body simulations on shared-memory and hybrid architectures. The code is significantly faster (factor of more than 17 over Gadget) and scales better than previously published alternatives. Improved physics models as well as algorithmic improvements have already led to scientific publications. The project is at the core of Intel's IPCC at Durham and will serve as a general framework for future simulations by the ICC.

Main developer of the project in collaboration with Dr. Pedro Gonnet.

<http://www.swiftsim.com>

QUICKSCHED A compact and efficient Open-Source C-language library (<http://arxiv.org/abs/1601.05384>) for task-based shared-memory parallel programming. QuickSched extends the standard dependency-only scheme of task-based programming with the concept of task conflicts, i.e. sets of tasks that can be executed in any order, yet not concurrently. These conflicts are modelled using exclusively lockable hierarchical resources. The library is the backbone of the SWIFT cosmological code.

<https://gitlab.cosma.dur.ac.uk/swift/quicksched>

Prizes and Awards

2016 **Times Higher Education Awards - Best Research Project of the Year**
2nd place and "highly commended" by the jury for the EAGLE simulation project.

Grants

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| 2017 | VENI Fellowship | EUR €250,000 |
| 2016 | CAASTRO grant for international visitors to visit ICRAR at the University of Western Australia for three weeks. | AUD \$3,700 |
| 2014 | Creation of an Intel Parallel Computing Centre at the ICC, Durham. Funding was used to hire a programmer for two years to work on the optimisation of the core routines of the SWIFT code. | GBP £170,952 |

Computing time

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| 2016 | Piz Daint - Swiss National Supercomputing Centre (CSCS) - Switzerland <i>Time awarded for the testing of the SWIFT code and its underlying library on Cray systems.</i> | 10k node hours |
| 2016 | SuperMUC - Leibniz Supercomputing Centre (LRZ) - Germany <i>Time awarded for the development of the parallel i/o aspects of the SWIFT code.</i> | 10M core hours |
| 2015 | JUQUEEN - Forschungszentrum Jülich (JSC) - Germany <i>Time awarded for the porting of the SWIFT code to BlueGene architecture.</i> | 2M core hours |

Journal Referee

Computer Physics Communications (CPC): Since May 2015

Monthly Notices of the Royal Astronomical Society (MNRAS): Since July 2015

The Astrophysical Journal (ApJ): Since October 2016


SuperComputing (SC): Poster Chair since June 2016

Languages

French  **Mother tongue.**

English  **Fluent speaking and writing.**

Studied five years in UK.

German  **Fluent speaking and writing.**

Good understanding of Swiss-German.

IT Skills

OS: *UNIX*, *Linux*.

Languages: *C*, *C++*,
Java, *Python*.

Scientific Tools: *Matlab*, *Octave*,
Mathematica, *LaTeX*.

HPC Tools: *CUDA*, *OpenMP*,
MPI.

Outreach

Taken part in outreach activities presenting the institute's research at various events including the 2013 and 2016 Royal Society Summer Exhibition in London (UK), the Science and Technology Fair in Bangkok (Thailand) and at the British Embassy in Stockholm (Sweden). Introduced people of various ages and vastly different backgrounds in science to the concepts of cosmology and numerical simulations through these exhibitions. Responsible for the technology aspects and development of new software.

Other Activities

SCR Executive member Member of postgraduate student representative committee within college. Tasks include organisation of events, communication with the college alumni and current students, organisation of public lectures, representation of students' views at university level.

College Mentor Mentoring first year undergraduate students in St-Aidan's College, supporting students with academic and personal issues.

Hobbies

Badminton Playing in doubles for the college and University staff teams.

Clarinet I've been playing classical music for more than 10 years.

Scientific Publications

82 papers published in main international peer-reviewed journals. First author in 7 of those. Papers had received more than 4700 citations by January 2019 (more than 400 citations for 1st author papers). Their combined impact factors (h -, g -, i_{10} , and i_{100} -index) are $h = 36$, $g = 70$, $i_{10} = 68$ and $i_{100} = 10$.

Journal Articles (in anti-chronological order)

- [82] *“Ring galaxies in the EAGLE hydrodynamical simulations”*
Citations: 1 A. Elagali, C. D. P. Lagos, O. I. Wong, L. Staveley-Smith, J. W. Trayford, **M. Schaller**, T. Yuan, and M. G. Abadi, *MNRAS* **481**, Dec. 2018, pp. 2951–2969, arXiv:1807.08251.
- [81] *“Growing a ‘cosmic beast’: observations and simulations of MACS J0717.5+3745”*
Citations: 8 M. Jauzac, D. Eckert, **M. Schaller**, J. Schwinn, R. Massey, Y. Bahé, C. Baugh, D. Barnes, C. Dalla Vecchia, H. Ebeling, D. Harvey, E. Jullo, S. T. Kay, J.-P. Kneib, M. Limousin, E. Medezinski, P. Natarajan, M. Nonino, A. Robertson, S. I. Tam, and K. Umetsu, *MNRAS* **481**, Dec. 2018, pp. 2901–2917, arXiv:1711.01324.
- [80] *“SEAGLE - I. A pipeline for simulating and modelling strong lenses from cosmological hydrodynamic simulations”*
Citations: 4 S. Mukherjee, L. V. E. Koopmans, R. B. Metcalf, N. Tessore, C. Tortora, **M. Schaller**, J. Schaye, R. A. Crain, G. Vernardos, F. Bellagamba, and T. Theuns, *MNRAS* **479**, Sep. 2018, pp. 4108–4125, arXiv:1802.06629.
- [79] *“The origin of diverse α -element abundances in galaxy discs”*
Citations: 11 J. T. Mackereth, R. A. Crain, R. P. Schiavon, J. Schaye, T. Theuns, and **M. Schaller**, *MNRAS* **477**, Jul. 2018, pp. 5072–5089, arXiv:1801.03593.
- [78] *“The impact of dark energy on galaxy formation. What does the future of our Universe hold?”*
Citations: 1 J. Salcido, R. G. Bower, L. A. Barnes, G. F. Lewis, P. J. Elahi, T. Theuns, **M. Schaller**, R. A. Crain, and J. Schaye, *MNRAS* **477**, Jul. 2018, pp. 3744–3759, arXiv:1710.06861.
- [77] *“Galaxy formation efficiency and the multiverse explanation of the cosmological constant with EAGLE simulations”*
Citations: 4 L. A. Barnes, P. J. Elahi, J. Salcido, R. G. Bower, G. F. Lewis, T. Theuns, **M. Schaller**, R. A. Crain, and J. Schaye, *MNRAS* **477**, Jul. 2018, pp. 3727–3743, arXiv:1801.08781.
- [76] *“What to expect from dynamical modelling of galactic haloes - II. The spherical Jeans equation”*
Citations: 5 W. Wang, J. Han, S. Cole, S. More, C. Frenk, and **M. Schaller**, *MNRAS* **476**, Jun. 2018, pp. 5669–5680, arXiv:1801.07373.
- [75] *“The diverse density profiles of galaxy clusters with self-interacting dark matter plus baryons”*
Citations: 22 A. Robertson, R. Massey, V. Eke, S. Tulin, H.-B. Yu, Y. Bahé, D. J. Barnes, R. G. Bower, R. A. Crain, C. Dalla Vecchia, S. T. Kay, **M. Schaller**, and J. Schaye, *MNRAS* **476**, May 2018, pp. L20–L24, arXiv:1711.09096.
- [74] *“Tidal stripping and the structure of dwarf galaxies in the Local Group”*
Citations: 22 A. Fattahi, J. F. Navarro, C. S. Frenk, K. A. Oman, T. Sawala, and **M. Schaller**, *MNRAS* **476**, May 2018, pp. 3816–3836, arXiv:1707.03898.
- [73] *“Reducing biases on H_0 measurements using strong lensing and galaxy dynamics: results from the EAGLE simulation”*
Citations: 8 A. S. Tagore, D. J. Barnes, N. Jackson, S. T. Kay, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **474**, Mar. 2018, pp. 3403–3422, arXiv:1706.07733.
- [72] *“Tidal dwarf galaxies in cosmological simulations”*
Citations: 7 S. Ploeckinger, K. Sharma, J. Schaye, R. A. Crain, **M. Schaller**, and C. Barber, *MNRAS* **474**, Feb. 2018, pp. 580–596, arXiv:1710.09380.
- [71] *“Comparing galaxy formation in semi-analytic models and hydrodynamical simulations”*
Citations: 13 P. D. Mitchell, C. G. Lacey, C. D. P. Lagos, C. S. Frenk, R. G. Bower, S. Cole, J. C. Helly, **M. Schaller**, V. Gonzalez-Perez, and T. Theuns, *MNRAS* **474**, Feb. 2018, pp. 492–521, arXiv:1709.08647.

- [70] “Data Release of UV to Submillimeter Broadband Fluxes for Simulated Galaxies from the EAGLE Project”
Citations: 8 P. Camps, A. Trčka, J. Trayford, M. Baes, T. Theuns, R. A. Crain, S. McAlpine, **M. Schaller**, and J. Schaye, *ApJS* **234**, Feb. 2018, 20, arXiv:1712.05583.
- [69] “The SAMI Galaxy Survey: understanding observations of large-scale outflows at low redshift with EAGLE simulations”
Citations: 2 E. Tescari, L. Cortese, C. Power, J. S. B. Wyithe, I.-T. Ho, R. A. Crain, J. Bland-Hawthorn, S. M. Croom, L. J. Kewley, J. Schaye, R. G. Bower, T. Theuns, **M. Schaller**, L. Barnes, S. Brough, J. J. Bryant, M. Goodwin, M. L. P. Gunawardhana, J. S. Lawrence, S. K. Leslie, Á. R. López-Sánchez, N. P. F. Lorente, A. M. Medling, S. N. Richards, S. M. Sweet, and C. Tonini, *MNRAS* **473**, Jan. 2018, pp. 380–397, arXiv:1709.01939.
- [68] “The relation between galaxy morphology and colour in the EAGLE simulation”
Citations: 13 C. A. Correa, J. Schaye, B. Clauwens, R. G. Bower, R. A. Crain, **M. Schaller**, T. Theuns, and A. C. R. Thob, *MNRAS* **472**, Nov. 2017, pp. L45–L49, arXiv:1704.06283.
- [67] “The evolution of the star formation rate function in the EAGLE simulations: a comparison with UV, IR and H α observations from $z = 8$ to $z = 0$ ”
Citations: 9 A. Katsianis, G. Blanc, C. P. Lagos, N. Tejos, R. G. Bower, A. Alavi, V. Gonzalez, T. Theuns, **M. Schaller**, and S. Lopez, *MNRAS* **472**, Nov. 2017, pp. 919–939, arXiv:1708.01913.
- [66] “The origin of the mass discrepancy-acceleration relation in Λ CDM”
Citations: 22 J. F. Navarro, A. Benítez-Llambay, A. Fattahi, C. S. Frenk, A. D. Ludlow, K. A. Oman, **M. Schaller**, and T. Theuns, *MNRAS* **471**, Oct. 2017, pp. 1841–1848, arXiv:1612.06329.
- [65] “The Cluster-EAGLE project: global properties of simulated clusters with resolved galaxies”
Citations: 36 D. J. Barnes, S. T. Kay, Y. M. Bahé, C. Dalla Vecchia, I. G. McCarthy, J. Schaye, R. G. Bower, A. Jenkins, P. A. Thomas, **M. Schaller**, R. A. Crain, T. Theuns, and S. D. M. White, *MNRAS* **471**, Oct. 2017, pp. 1088–1106, arXiv:1703.10907.
- [64] “Baryon effects on void statistics in the EAGLE simulation”
Citations: 8 E. Pailas, C. D. P. Lagos, N. Padilla, P. Tissera, J. Helly, and **M. Schaller**, *MNRAS* **470**, Oct. 2017, pp. 4434–4452, arXiv:1609.00101.
- [63] “The Hydrangea simulations: galaxy formation in and around massive clusters”
Citations: 35 Y. M. Bahé, D. J. Barnes, C. Dalla Vecchia, S. T. Kay, S. D. M. White, I. G. McCarthy, J. Schaye, R. G. Bower, R. A. Crain, T. Theuns, A. Jenkins, S. L. McGee, **M. Schaller**, P. A. Thomas, and J. W. Trayford, *MNRAS* **470**, Oct. 2017, pp. 4186–4208, arXiv:1703.10610.
- [62] “Small-scale galaxy clustering in the eagle simulation”
Citations: 12 M. C. Artale, S. E. Pedrosa, J. W. Trayford, T. Theuns, D. J. Farrow, P. Norberg, I. Zehavi, R. G. Bower, and **M. Schaller**, *MNRAS* **470**, Sep. 2017, pp. 1771–1787, arXiv:1611.05064.
- [61] “Optical colours and spectral indices of $z = 0.1$ eagle galaxies with the 3D dust radiative transfer code skirt”
Citations: 34 J. W. Trayford, P. Camps, T. Theuns, M. Baes, R. G. Bower, R. A. Crain, M. L. P. Gunawardhana, **M. Schaller**, J. Schaye, and C. S. Frenk, *MNRAS* **470**, Sep. 2017, pp. 771–799, arXiv:1705.02331.
- [60] “Knowing the unknowns: uncertainties in simple estimators of galactic dynamical masses”
Citations: 36 D. J. R. Campbell, C. S. Frenk, A. Jenkins, V. R. Eke, J. F. Navarro, T. Sawala, **M. Schaller**, A. Fattahi, K. A. Oman, and T. Theuns, *MNRAS* **469**, Aug. 2017, pp. 2335–2360, arXiv:1603.04443.
- [59] “Barred galaxies in the EAGLE cosmological hydrodynamical simulation”
Citations: 17 D. G. Algorry, J. F. Navarro, M. G. Abadi, L. V. Sales, R. G. Bower, R. A. Crain, C. Dalla Vecchia, C. S. Frenk, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **469**, Jul. 2017, pp. 1054–1064, arXiv:1609.05909.
- [58] “Tidal features of classical Milky Way satellites in a Λ cold dark matter universe”
Citations: 5 M.-Y. Wang, A. Fattahi, A. P. Cooper, T. Sawala, L. E. Strigari, C. S. Frenk, J. F. Navarro, K. Oman, and **M. Schaller**, *MNRAS* **468**, Jul. 2017, pp. 4887–4901, arXiv:1611.00778.
- [57] “Properties of Local Group galaxies in hydrodynamical simulations of sterile neutrino dark matter cosmologies”
Citations: 27 M. R. Lovell, S. Bose, A. Boyarsky, R. A. Crain, C. S. Frenk, W. A. Hellwing, A. D. Ludlow, J. F. Navarro, O. Ruchayskiy, T. Sawala, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **468**, Jul. 2017, pp. 4285–4298, arXiv:1611.00010.

- [56] *“The link between galaxy and black hole growth in the eagle simulation”*
Citations: 34 S. McAlpine, R. G. Bower, C. M. Harrison, R. A. Crain, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **468**, Jul. 2017, pp. 3395–3407, arXiv:1701.01122.
- [55] *“Winds of change: reionization by starburst galaxies”*
Citations: 11 M. Sharma, T. Theuns, C. Frenk, R. G. Bower, R. A. Crain, **M. Schaller**, and J. Schaye, *MNRAS* **468**, Jun. 2017, pp. 2176–2188, arXiv:1606.08688.
- [54] *“Angular momentum evolution of galaxies over the past 10 Gyr: a MUSE and KMOS dynamical survey of 400 star-forming galaxies from $z = 0.3$ to 1.7”*
Citations: 28 A. M. Swinbank, C. M. Harrison, J. Trayford, **M. Schaller**, I. Smail, J. Schaye, T. Theuns, R. Smit, D. M. Alexander, R. Bacon, R. G. Bower, T. Contini, R. A. Crain, C. de Breuck, R. Decarli, B. Epinat, M. Fumagalli, M. Furlong, A. Galametz, H. L. Johnson, C. Lagos, J. Richard, J. Vernet, R. M. Sharples, D. Sobral, and J. P. Stott, *MNRAS* **467**, May 2017, pp. 3140–3159, arXiv:1701.07448.
- [53] *“How to get cool in the heat: comparing analytic models of hot, cold, and cooling gas in haloes and galaxies with EAGLE”*
Citations: 19 A. R. H. Stevens, C. d. P. Lagos, S. Contreras, D. J. Croton, N. D. Padilla, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **467**, May 2017, pp. 2066–2084, arXiv:1608.04389.
- [52] *“Mass-Discrepancy Acceleration Relation: A Natural Outcome of Galaxy Formation in Cold Dark Matter Halos”*
Citations: 33 A. D. Ludlow, A. Benítez-Llambay, **M. Schaller**, T. Theuns, C. S. Frenk, R. Bower, J. Schaye, R. A. Crain, J. F. Navarro, A. Fattahi, and K. A. Oman, *Physical Review Letters* **118**, Apr. 2017, 161103, arXiv:1610.07663.
- [51] *“The properties of ‘dark’ Λ CDM haloes in the Local Group”*
Citations: 13 A. Benítez-Llambay, J. F. Navarro, C. S. Frenk, T. Sawala, K. Oman, A. Fattahi, **M. Schaller**, J. Schaye, R. A. Crain, and T. Theuns, *MNRAS* **465**, Mar. 2017, pp. 3913–3926, arXiv:1609.01301.
- [50] *“The origin of scatter in the stellar mass-halo mass relation of central galaxies in the EAGLE simulation”*
Citations: 30 J. Matthee, J. Schaye, R. A. Crain, **M. Schaller**, R. Bower, and T. Theuns, *MNRAS* **465**, Feb. 2017, pp. 2381–2396, arXiv:1608.08218.
- [49] *“Size evolution of normal and compact galaxies in the EAGLE simulation”*
Citations: 86 M. Furlong, R. G. Bower, R. A. Crain, J. Schaye, T. Theuns, J. W. Trayford, Y. Qu, **M. Schaller**, M. Berthet, and J. C. Helly, *MNRAS* **465**, Feb. 2017, pp. 722–738, arXiv:1510.05645.
- [48] *“The dark nemesis of galaxy formation: why hot haloes trigger black hole growth and bring star formation to an end”*
Citations: 70 R. G. Bower, J. Schaye, C. S. Frenk, T. Theuns, **M. Schaller**, R. A. Crain, and S. McAlpine, *MNRAS* **465**, Feb. 2017, pp. 32–44, arXiv:1607.07445.
- [47] *“Size matters: abundance matching, galaxy sizes, and the Tully-Fisher relation in EAGLE”*
Citations: 15 I. Ferrero, J. F. Navarro, M. G. Abadi, L. V. Sales, R. G. Bower, R. A. Crain, C. S. Frenk, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **464**, Feb. 2017, pp. 4736–4746, arXiv:1607.03100.
- [46] *“The EAGLE simulations: atomic hydrogen associated with galaxies”*
Citations: 52 R. A. Crain, Y. M. Bahé, C. d. P. Lagos, A. Rahmati, J. Schaye, I. G. McCarthy, A. Marasco, R. G. Bower, **M. Schaller**, T. Theuns, and T. van der Hulst, *MNRAS* **464**, Feb. 2017, pp. 4204–4226, arXiv:1604.06803.
- [45] *“The low-mass end of the baryonic Tully-Fisher relation”*
Citations: 31 L. V. Sales, J. F. Navarro, K. Oman, A. Fattahi, I. Ferrero, M. Abadi, R. Bower, R. A. Crain, C. S. Frenk, T. Sawala, **M. Schaller**, J. Schaye, T. Theuns, and S. D. M. White, *MNRAS* **464**, Jan. 2017, pp. 2419–2428, arXiv:1602.02155.
- [44] *“A chronicle of galaxy mass assembly in the EAGLE simulation”*
Citations: 46 Y. Qu, J. C. Helly, R. G. Bower, T. Theuns, R. A. Crain, C. S. Frenk, M. Furlong, S. McAlpine, **M. Schaller**, J. Schaye, and S. D. M. White, *MNRAS* **464**, Jan. 2017, pp. 1659–1675, arXiv:1609.07243.
- [43] *“Being WISE II: Reducing the Influence of Star formation History on the Mass-to-Light Ratio of Quiescent Galaxies”*
Citations: 13 M. A. Norris, G. Van de Ven, E. Schinnerer, R. A. Crain, S. Meidt, B. Groves, R. G. Bower, M. Furlong, **M. Schaller**, J. Schaye, and T. Theuns, *ApJ* **832**, Dec. 2016, 198, arXiv:1608.07584.

- [42] *"Music from the heavens - gravitational waves from supermassive black hole mergers in the EAGLE simulations"*
Citations: 11 J. Salcido, R. G. Bower, T. Theuns, S. McAlpine, **M. Schaller**, R. A. Crain, J. Schaye, and J. Regan, *MNRAS* **463**, Nov. 2016, pp. 870–885, arXiv:1601.06156.
- [41] *"Far-infrared and dust properties of present-day galaxies in the EAGLE simulations"*
Citations: 26 P. Camps, J. W. Trayford, M. Baes, T. Theuns, **M. Schaller**, and J. Schaye, *MNRAS* **462**, Oct. 2016, pp. 1057–1075, arXiv:1607.04402.
- [40] *"Supermassive black holes in the EAGLE Universe. Revealing the observables of their growth"*
Citations: 39 Y. Rosas-Guevara, R. G. Bower, J. Schaye, S. McAlpine, C. Dalla Vecchia, C. S. Frenk, **M. Schaller**, and T. Theuns, *MNRAS* **462**, Oct. 2016, pp. 190–205, arXiv:1604.00020.
- [39] *"Galaxies in the EAGLE hydrodynamical simulation and in the Durham and Munich semi-analytical models"*
Citations: 53 Q. Guo, V. Gonzalez-Perez, Q. Guo, **M. Schaller**, M. Furlong, R. G. Bower, S. Cole, R. A. Crain, C. S. Frenk, J. C. Helly, C. G. Lacey, C. d. P. Lagos, P. Mitchell, J. Schaye, and T. Theuns, *MNRAS* **461**, Oct. 2016, pp. 3457–3482, arXiv:1512.00015.
- [38] *"The origin of the α -enhancement of massive galaxies"*
Citations: 21 M. C. Segers, J. Schaye, R. G. Bower, R. A. Crain, **M. Schaller**, and T. Theuns, *MNRAS* **461**, Sep. 2016, pp. L102–L106, arXiv:1603.05653.
- [37] *"The low abundance and insignificance of dark discs in simulated Milky Way galaxies"*
Citations: 11 **M. Schaller**, C. S. Frenk, A. Fattahi, J. F. Navarro, K. A. Oman, and T. Sawala, *MNRAS* **461**, Sep. 2016, pp. L56–L61, arXiv:1605.02770.
- [36] *"The effect of baryons on redshift space distortions and cosmic density and velocity fields in the EAGLE simulation"*
Citations: 26 W. A. Hellwing, **M. Schaller**, C. S. Frenk, T. Theuns, J. Schaye, R. G. Bower, and R. A. Crain, *MNRAS* **461**, Sep. 2016, pp. L11–L15, arXiv:1603.03328.
- [35] *"The link between the assembly of the inner dark matter halo and the angular momentum evolution of galaxies in the EAGLE simulation"*
Citations: 51 J. Zavala, C. S. Frenk, R. Bower, J. Schaye, T. Theuns, R. A. Crain, J. W. Trayford, **M. Schaller**, and M. Furlong, *MNRAS* **460**, Aug. 2016, pp. 4466–4482, arXiv:1512.02636.
- [34] *"It is not easy being green: the evolution of galaxy colour in the EAGLE simulation"*
Citations: 55 J. W. Trayford, T. Theuns, R. G. Bower, R. A. Crain, C. d. P. Lagos, **M. Schaller**, and J. Schaye, *MNRAS* **460**, Aug. 2016, pp. 3925–3939, arXiv:1601.07907.
- [33] *"Alignments between galaxies, satellite systems and haloes"*
Citations: 15 S. Shao, M. Cautun, C. S. Frenk, L. Gao, R. A. Crain, **M. Schaller**, J. Schaye, and T. Theuns, *MNRAS* **460**, Aug. 2016, pp. 3772–3783, arXiv:1605.01728.
- [32] *"Missing dark matter in dwarf galaxies?"*
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Invited Conference Talks

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|----------------|---|---------------------|
| February 2019 | Royal Society UK-France Bilateral International Meeting <i>The SWIFT simulation code: Solving the exa-scale challenge of cosmological simulations</i> | Chicheley Hall, UK |
| November 2018 | IHP trimester workshop on "Computational Methods" <i>Towards exa-scale for cosmological hydro simulations: challenges and (some) solutions in the SWIFT code</i> | Paris, France |
| April 2018 | EWASS 2018 <i>Sub-structures in and around state-of-the-art simulated clusters</i> | Liverpool, UK |
| March 2018 | Supercomputing Frontiers Europe 2018 <i>Individual time-stepping in cosmological simulations: A challenge for strong scaling and domain decomposition algorithms</i> | Warsaw, Poland |
| March 2018 | SIAM Conference on Parallel Processing for Scientific Computing <i>Using Task-Based Parallelism, Asynchronous MPI and Dynamic Workload-Based Domain Decomposition to Achieve Near-Perfect Load-Balancing for Particle-Based Hydrodynamics and Gravity</i> | Tokyo, Japan |
| October 2017 | Galaxy Groups and Clusters II: Laboratories to study galaxy evolution <i>Review of galaxy cluster simulations</i> | La Serena, Chile |
| Mai 2017 | Dark Matter Workshop <i>Simulations, dark discs, MDAR</i> | Montpellier, France |
| March 2017 | Mock Perth: Challenges for Simulations in the Era of SKA and Large IFU Surveys <i>Dwarf galaxies in the EAGLE simulation and future runs</i> | Perth, Australia |
| May 2016 | Dark Matter in the Milky Way <i>Review of the dark matter content in simulated MWs</i> | Mainz, Germany |
| May 2016 | Galaxy Formation Simulations <i>Current numerical and physical limitations of the EAGLE and APOSTLE simulations; some paths for the future.</i> | Ringberg, Germany |
| September 2015 | CSAM-15 Summer School <i>Task-based parallelism for cosmological simulations</i> | Jülich, Germany |
| August 2015 | 1st R. Juszkiewicz Symposium <i>Exploring the effects of baryons on the dark matter distribution in the Universe</i> | Warsaw, Poland |

Contributed Conference Talks

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| December 2018 | Virgo workshop <i>SWIFT: Project status</i> | Leiden, Netherland |
| October 2018 | BUFFALO collaboration workshop <i>Simulations WG: Clusters and high-z</i> | Marseille, France |
| September 2018 | 15th Potsdam Thinkshop <i>Feedback impact on dark matter and cosmology</i> | Potsdam, Germany |
| June 2018 | 13th SPHERIC workshop <i>SWIFT: Maintaining weak-scalability with a dynamic range of 10^3 in time-step size to harness extreme adaptivity</i> | Galway, Ireland |
| April 2018 | Mock Durham 2018 <i>SWIFT: First steps towards cosmological volumes with full EAGLE physics</i> | Durham, UK |
| April 2018 | EWASS 2018 <i>- Rotation curves at high redshift: theory and observations - The next-generation cosmological code SWIFT</i> | Liverpool, UK |
| March 2018 | Computational Galaxy Formation 2018 <i>First steps towards cosmological simulations with full EAGLE physics</i> | Ringberg, Germany |
| December 2017 | Virgo Workshop <i>- SWIFT project update - Dark disks in the Auriga simulations</i> | Munich, Germany |
| November 2017 | Intel HPC Developer conference 2016 <i>Task-based Calculation + Task-based MPI + Task-based I/O = Maximal Performance</i> | Denver, USA |
| September 2017 | Frontiers of Astrophysical Modeling | Leuven, Belgium |

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| | <i>The next generation cosmological code SWIFT: status and first results</i> | |
| August 2017 | 7th DiRAC Day <i>Unravelling the mysteries of galaxy formation with the EAGLE and APOSTLE cosmological simulations and speeding these up with SWIFT</i> | Exeter, UK |
| July 2017 | HPC Workshop <i>Task-based parallelism and the cosmological hydrodynamical code SWIFT</i> | Hartree Centre, UK |
| July 2017 | UK National Astronomy Meeting 2017 <i>The cosmological hydrodynamical code SWIFT</i> | Hull, UK |
| June 2017 | EWASS 2017 <i>The distribution of sub-structures in ΛCDM simulations of cluster</i> | Prague, Czech Republic |
| January 2017 | DEX XI <i>Limitations of the EAGLE simulations.</i> | Edinburgh, UK |
| December 2016 | Virgo Workshop <i>SWIFTly solving gravity: The FMM-MM in SWIFT</i> | Durham, UK |
| November 2016 | Intel HPC Developer conference 2016 <i>SWIFT: Using Task-Based Parallelism, Fully Asynchronous Communication and Vectorization to achieve maximal HPC performance</i> | Salt Lake City, USA |
| October 2016 | Intel IPCC User Meeting <i>Scheduling tasks efficiently on 256 cores – The KNL challenge</i> | Toulouse, France |
| July 2016 | EWASS 2016 <i>Mock lensing and dark matter profiles from simulated rich clusters</i> | Athens, Greece |
| July 2016 | UK National Astronomy Meeting 2016 <i>Mock lensing and dark matter profiles from simulated rich clusters</i> | Nottingham, UK |
| June 2016 | Platform for Advanced Scientific Computing Conference <i>SWIFT: Using task-based parallelism, fully asynchronous communication, and graph partition-based domain decomposition for strong scaling on more than 100,000 cores</i> | Lausanne, Switzerland |
| April 2016 | Mock Santiago Workshop <i>Mock catalogues and galaxy database from the EAGLE simulation</i> | Santiago, Chile |
| March 2016 | Intel IPCC User Meeting <i>Optimisation of the core kernels of the particle-based code SWIFT using AVX and AVX2</i> | Ostrava, Czech Republic |
| March 2016 | LRZ Extreme scaling workshop <i>SWIFT: SPH With Inter-dependent Fine-grained Tasking</i> | München, Germany |
| December 2015 | Virgo Workshop <i>The abundance and importance of dark discs</i> | Leiden, Netherlands |
| October 2015 | Intel IPCC User Meeting <i>Multi-threaded task-based asynchronous MPI communications</i> | München, Germany |
| September 2015 | 5th DiRAC Day <i>SWIFT: A fast cosmological code</i> | Cambridge, UK |
| August 2015 | 1st R. Juszkiewicz Symposium <i>SWIFT: A fast cosmological code</i> | Warsaw, Poland |
| June 2015 | UK National Astronomy Meeting 2015 <i>- Exploring the effects of baryons on the dark matter distribution in the Universe</i> <i>- SWIFT: A fast cosmological code</i> | Llandudno, UK |
| June 2015 | EWASS 2015 <i>The impact of the hydrodynamics scheme on galaxies and gas properties in galaxy formation simulations</i> | Tenerife, Spain |
| February 2015 | Cosmic Over-Densities Through Cosmic Time <i>Exploring the effects of baryons on the dark matter distribution in the Universe</i> | Birmingham, UK |
| January 2015 | DEX XI <i>Exploring the effects of baryons on the dark matter distribution in the Universe</i> | Edinburgh, UK |
| November 2014 | Frontier Fields Workshop <i>The mass and internal structure of clusters in a ΛCDM simulation including the effects of baryons</i> | Yale, USA |
| June 2014 | UK National Astronomy Meeting 2014 <i>- The mass and internal structure of halos in ΛCDM</i> <i>- The density profiles of simulated clusters: Impact of baryons or dark matter self-interactions ?</i> | Portsmouth, UK |

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| May 2014 | Cosmology SAM and simulations <i>Impact of the hydro scheme on galaxy formation simulations</i> | Marseille, France |
| January 2014 | Virgo Workshop - <i>Impact of the SPH variations on galaxy evolution simulations</i> - <i>Latest developments of the SWIFT code</i> | Leiden, Netherlands |
| September 2013 | Exa-scale Computing in Astrophysics <i>A tentative meshless movingmesh scheme</i> | Ascona, Switzerland |
| July 2013 | Ripples in the Cosmos <i>Impact of baryons on the internal structure of haloes</i> | Durham, UK |
| June 2013 | Virgo Workshop <i>SWIFT: SPH With Inter-dependent Fine-grained Tasking - Status of the project</i> | München, Germany |
| June 2013 | 8th SPHERIC Workshop <i>On the use of particle based methods for cosmological hydrodynamical simulations</i> | Trondheim, Norway |
| September 2012 | COSMOCOMP Workshop <i>AREPO Galaxies and a "new" Meshless Moving-Mesh Code</i> | Trieste, Italy |