

Cover Page



Universiteit Leiden



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**Author:** Barber, C.R.

**Title:** Monsters in the deep: using simulations to understand the excess baryonic mass in the centres of high-mass, early-type galaxies

**Issue Date:** 2018-11-20

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# Publications

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## Refereed Publications

**Barber C.**, Schaye J., Crain R. A., *Calibrated, cosmological hydrodynamical simulations with variable IMFs II: Correlations between the IMF and global galaxy properties*, accepted for publication in MNRAS.

**Barber C.**, Crain R. A., Schaye J., 2018, *Calibrated, cosmological hydrodynamical simulations with variable IMFs I: method and effect on global galaxy scaling relations*, MNRAS, 479, 5448.

Ploeckinger S., Sharma K., Schaye J., Crain R. A., Schaller M., **Barber C.**, 2017, *Tidal dwarf galaxies in cosmological simulations*, MNRAS, 474, 580.

**Barber C.**, Schaye J., Bower R. G., Crain R. A., Schaller M., Theuns T., 2016, *The origin of compact galaxies with anomalously high black hole masses*, MNRAS, 460, 1147.

**Barber C.**, Starkeburg E., Navarro J. F., McConnachie A. W., 2015, *Galactic tides and the shape and orientation of dwarf galaxy satellites*, MNRAS, 447, 1112.

**Barber C.**, Courteau S., Roediger J., Schiavon R., 2014, *Validation of optimized population synthesis through mock spectra and Galactic globular clusters*, MNRAS, 440, 2953.

**Barber C.**, Starkeburg E., Navarro J., McConnachie A. W., Fattahi A., 2014, *The orbital ellipticity of satellite galaxies and the mass of the Milky Way*, MNRAS, 437, 959.

Fattahi A., Navarro J. F., Starkeburg E., **Barber C.**, McConnachie A. W., 2013, *Galaxy Pairs in the Local Group*, MNRAS, 431, 73.

## Publications submitted

**Barber C.**, Schaye J., Crain R. A., *Calibrated, cosmological hydrodynamical simulations with variable IMFs III: Spatially-resolved properties and evolution*, submitted to MNRAS.

van Son L. A. C., **Barber C.**, Bahé Y. M., Schaye J., Barnes D. J., Crain R. A., Kay S. T., Theuns T., Dalla Vecchia C. *Galaxies with monstrous black holes in galaxy cluster environments*, submitted to MNRAS.

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## *Curriculum Vitae*

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I was born on 21 March, 1989 in Ottawa, Ontario, Canada. I was fortunate to grow up in the small village of Merrickville where the stars are seen much more easily than in a city, giving me a close connection with the night sky at an early age. Even when we moved to the city of Ottawa, I still recall the dozens of camping trips to the uninhabited parts of Canada where light pollution is minimal, lying in a field under the stars and realizing that what is out there is so much bigger than anything going on on our little spinning ball of dust. Since then I have always been fascinated with the night sky.

I have always been interested in Science, and was one of those kids who would get a microscope for Christmas and spend hours looking at dead fruit flies on the slide. I had a knack for Science in middle school, but it wasn't until I attended South Carleton High School in 2004 that my interest in physics was really sparked by the enthusiasm of my excellent Science teachers.

In 2007, I decided to combine my interest in astronomy and physics and pursued an undergraduate degree in Astrophysics at Queen's University in Kingston, Ontario, Canada. There I learned the power of the scientific method, and through it the amazing things we can learn about the Universe. I completed my 4th year thesis project with Prof. Stephane Courteau and Dr. Joel Roediger on the validation of using numerical full spectrum synthesis on the integrated spectra of Galactic globular clusters to derive the distribution of stellar properties within them.

From there I decided to continue along the academic career path, in 2011 doing a Master's in Astrophysics at the University of Victoria in British Columbia, Canada. There I worked with Prof. Julio Navarro and Dr. Else Starkenburg studying the formation and evolution of dwarf galaxies using semi-analytic models combined with dark matter-only simulations.

Seeking adventure in a foreign country, I attended Leiden University in 2014 to pursue a PhD studying galaxy formation and evolution using the EAGLE simulations with Prof. Joop Schaye. The research presented in this thesis is the result of those PhD studies. I have been fortunate enough to have presented my research at various international conferences in the Netherlands, England, Italy, Germany, and Belgium.

I have recently become fascinated by advances in machine learning techniques and their usefulness in helping to solve real-world problems. This is why I have decided to pursue a new career in data science, for which my academic career has prepared me well. My love for astronomy will never die, and I look forward to involving myself in outreach programs to help inspire future generations of scientists in the years to come.



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## Acknowledgements

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There are so many amazing people who have helped me get to where I am today that need to be thanked, as I am certain it wouldn't have happened without their inspiration, support, and leadership throughout the years.

First and foremost, I thank my high school physics teacher Ian Collins for being a great inspiration by making physics fun, you were truly the reason why I decided to go into science in University. I thank my Queen's physics buddies Bheeshmon, Carolyn, Greg, Joel, Meghan, Mitch, Naoya, and Popo for helping each other get through undergrad. Our reunions and camping/hiking trips since then have been amazing, and I'm looking forward to more in the future! Thanks as well to my Uvic friends Azi, Jason, Steph, Masen, Hannah, Charli, and Adrien (and many others) for the laughs, beers, hiking trips, and wings nights. Else, you helped me immensely in finishing my Master's, and as the first Dutch person I ever met you definitely played a big part in my decision to move to the Netherlands. Azi, thank you so much for the emergency evening ice cream and chocolate, Iranian dancing, and eating my leftover bananas at the end of the week, you definitely made the Master's much more fun!

And of course there are many wonderful people at the Sterrewacht to thank. First, thanks to the computer and secretarial staff for keeping everything running smoothly throughout the years despite the huge number of researchers in the department. Marijke, thanks for being an awesome officemate (and sorry about the bananas). Monica, Marco, Alex, Joki, Tiago, Lorrie, Sylvia, Camila, Sowgat, Matthieu, James, Yannick, Stijn, Nastasha, thanks for the weekly bouldering sessions and the sense of community and support you all brought to the group, and for making preprint meetings so much more fun. Thanks Lieke for being such a smart, motivated student and making my life as your supervisor super easy, I'm sure you'll go far in whichever direction in life you choose.

Andrew, Geert Jan, Mike, Ann-Sofie, and Eva, thanks for all the bizarre conversations at lunch, coffee, and borrel, as well as all the movies, board games, and D&D nights. Andrew and Geert Jan, thanks for coming back to North America with me, I'm looking forward to bothering you with visits over the next few years (and GJ thanks for translating my summary). Mike and Charlotte, thanks for teaching me what "cream tea" is and helping me with my British accent, I think I've nailed it now, maybe you'll be able to teach me the Edinburgh one soon. Ann-Sofie, thanks for sharing my weird sense of humour, you should come visit us in Canada, I promise there will be snow! Eva, thanks for being an awesome co-paranymph with me. Mike and Ann-Sofie, thanks for being my paranymphs! And especially Charlotte, thanks for all the cake.

Aayush, Jorryt, Christian, Nico, Gaby, Ricardo, David, Valeria, Luke, Niels, thanks for the fun conversations and parties over the years. Allison, keep that Canadian spirit alive. Thomas, keep on being a smooth operator, I hope to see you floating around in space someday!

Thanks to the social committee, especially Henriette, Margot, Ann-Sofie, Steven and Maike, the unsung heroes of the Sterrewacht BBQ, Sinterklaas, and the Christmas lunch. Also thanks to the Borrel committees for keeping me hydrated throughout the years: David, Mason, Allison, Christian, Ann-Sofie, myself, Nico, Pedro, Santiago, Eleonora, Kim, Maria Christina, Francisca, Kirsty, Hiddo, Fraser, and Stijn.

To my family, thanks for all of the support and for always believing in me, never having a doubt that I could get anywhere I wanted to in life. Especially thanks to Kyle for designing the cover of this thesis. Most of all, thank you Zoë for following me to every end of the Earth over the years, as well as for your constant, loving support and silly sense of humour which kept me (mostly) sane. I'm looking forward to the next step in our journey together back in Canada where, yes, we can finally get a dog.