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**A molecular journey : tales of sublimating ices from hot cores to comets**  
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# LIST OF PUBLICATIONS

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## Refereed publications

*Low levels of methanol deuteration in the high-mass star-forming region NGC 6334I*

**E. G. Bøgelund**, B. A. McGuire, N. F. W. Ligterink, V. Taquet, C. L. Brogan, T. R. Hunter, J. C. Pearson, M. R. Hogerheijde, E. F. van Dishoeck, 2018, *Astronomy & Astrophysics*, 615, 88

*Exploring the volatile composition of comets C/2012 F6 (Lemmon) and C/2012 S1 (ISON) with ALMA*

**E. G. Bøgelund** & M. R. Hogerheijde, 2017, *Astronomy & Astrophysics*, 604, 131

## Submitted publications

*Methylamine and other simple N-bearing species in the hot cores NGC 6334I MM1 – 3*

**E. G. Bøgelund**, B. A. McGuire, M. R. Hogerheijde, E. F. van Dishoeck, N. F. W. Ligterink, *Astronomy & Astrophysics*, under review

*Molecular complexity on disk-scales uncovered by ALMA: The composition of the high-mass protostar AFGL 4176*

**E. G. Bøgelund**, A. G. Barr, V. Taquet, N. F. W. Ligterink, M. V. Persson, M. R. Hogerheijde, E. F. van Dishoeck, submitted to *Astronomy & Astrophysics*



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# CURRICULUM VITAE

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I was born at Hvidovre Hospital, Denmark, on the 12th of November 1987 and grew up in Valby, a suburban area located in the south-western corner of the Copenhagen Municipality. As most kids, I went through a number of careers I wanted to pursue when I grew up, including becoming an actress, a hairdresser and a veterinarian, whereas scientist or astronomer never made the list. This gradually changed as I worked my way through primary and secondary school and discovered that I had a talent for the natural sciences. In addition, visits to Experimentarium (an interactive science museum in Copenhagen), in particular accompanied by my granddad, who worked as a physics teacher and was excellent at explaining everything from the colours on the surface of soap bubbles to why it doesn't hurt to lie on a bed of pointed nails (if you do it right!), taught me the playful nature of these sciences.

From 2004 to 2007 I attended Vestre Borgerdyd Gymnasium where I followed the exact science track. Although both biology and chemistry had my fancy during my high school years, I liked geography the best and especially the field of meteorology fascinated me. After learning that meteorology is categorised as a subfield of geophysics, my path seemed set and I enrolled in the physics program at the University of Copenhagen. However, my ambition of studying geophysics did not last long into the first year of the bachelor program where many other fields of physics, including astronomy and biophysics, caught my attention. Finally, I decided on particle physics and in the summer of 2010, I graduated from the bachelor program with a project on the interactions of gauge bosons under the supervision of Dr. Jørgen Beck Hansen.

It was not until halfway through my master studies that astronomy again caught my attention. This was at the time where I had to pick a topic for my master project. After meeting with Dr. Jes Jørgensen at the Center for Star and Planet Formation, I was quickly convinced that I wanted to do a project with him. We decided on a project which focused on identifying and classifying young stellar objects using data from the Spitzer Space Telescope. As I had only limited experience with astronomy, having followed only introductory courses during my bachelor, I spent the second half of my master catching up on relevant astrophysical courses.

Towards the end of my master studies, an invitation to apply for the first edition of the Leiden/ESA Astrophysics Program for Summer Students (LEAPS) landed in my mailbox. The summer school was to take place in the summer of 2013, which clashed horribly with the submission deadline for my master thesis. Nonetheless, Jes convinced me that I should apply for the program and I am very happy he did! I was accepted into the program and enjoyed three exciting months in Leiden where I worked with Dr. Lynn Carlson on a project aimed at characterising star-forming regions in the Small Magellanic Cloud.

The time I spent at Leiden Observatory during the LEAPS summer school, opened my eyes to the possibility of pursuing a PhD at the institute and in the winter of 2013

I applied to the graduate program at Leiden University. After a second visit, in the beginning of 2014, I was convinced that Leiden was the place for me and I was very happy to accept the offer of a PhD position with Prof. dr. Michiel Hogerheijde, starting in June 2014. During my PhD I have attended schools in the Netherlands, Germany, Switzerland, France and Belgium and presented my work at conferences in Berlin, London and Indian Wells, California, with support from the Leids Kerkhoven Bosscha Fonds.

After obtaining my PhD, I will be seeking challenges outside of the world of classic academia and I am very excited at the prospect of applying and further developing the skills I have acquired during my PhD in a broader societal context.

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## ACKNOWLEDGEMENTS

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The PhD experience has presented me with some of the biggest challenges of my life and there are so many wonderful people I need to thank for their help and support during this time, as I am certain I would not be where I am today if it was not for them.

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A big thank you to the people who keep the institute running smoothly. In particular the secretariat staff for their support on a variety of day-to-day activities and Erik Deul and the computer systems support group for quickly resolving any technical problem I have faced over the past years. Also, I would like to thank the members of the borrel and social committees for arranging Friday borrels, Christmas lunches, Sinterklaas events and summer barbecues. Your hard work made social time at the Observatory a lot of fun. Finally, I would like to thank Xander Tielens and the PBC for support and encouragement, especially during the times when the completion of my thesis seemed very far off.

To the current and past PhDs and postdocs of the Sterrewacht: Vincent, Claudia, Aayush, Mieke, Arthur, Merel, Sierk, Lukasz, Eleonora, Valeriya, Gabi, Jorryt, Ko-Ju, Kirsten, Danna, Michal, Nadia, Anna-Lea, Heather, Nienke, Ricardo, David, Cam, Emanuelle, Pablo, Margot, Magnus, Mihkel, Maria, Anna, Andreas and many, many others, thank you for the many scientific and friendly discussions over coffee or in the corridors and for making the Observatory an amazing place to work. A special thank you to Allison for lending an understanding ear at the time when completing my PhD seemed an endless uphill climb and for introducing me to the concept of emergency wine. To Jeroen for sharing your love of beer and for putting up with my feeble and mispronounced attempts at Dutch during 'Dutch lunch'. And to Niels for your help and moral

support during the ups and downs I have encountered over the past years.

To Mike, Charlotte, Chris, Zoë, Geert Jan and Andrew: Thank you for your friendship, for the talks, the lunches, coffee breaks and borrels, for the nights with movies (although some of you have truly horrible tastes!) and boardgames, for dinners, delicious cakes, proper English breakfast and servings of tea, for carrying a countless number of boxes when moving needed to be done and for letting me cuddle your cats. Leiden is not the same without you.

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Also outside of the Observatory there are people who have filled my life in Leiden with joy. When I first moved to the city I was fortunate enough to find a house with the best house mates one can dream of: Eva and Ilo. I will forever be grateful to you for taking a chance with a non-dutch house mate and inviting me to live with you. You made my arrival in Leiden easy and comfortable and provided a home, complete with hamster. I'm so happy to have met you and look forward to sharing many more dinners, parties and FouLaNi dates with you in the future. A very big thank you also to Wijnand for helping me with the design of my thesis cover, but even more so for your kindness, warm heart and cheerfulness. To my team mates at Volleybal Club Oegstgeest: Thank you for making me feel welcome from the very first day, for the teamavonds and high teas and for the many trips around Zuid-Holland for Friday night matches. Playing volleyball with you is the best stress-cure imaginable.

Moving to Leiden was both exciting and scary and it was not without a heavy heart that I left Copenhagen and my friends. Til alle mine smukke, kloge og helt igennem vidunderlige veninder: I er mit sikkerhedsnet, I lytter, støtter og trøster, I er med mig lige meget hvor min vej fører mig hen. Jeres venskab betyder alt. Til mine efterskolepiger: Anja, Marlene, Julie, Mia og Mette, selvom der nogle gange går alt for lang tid imellem at vi ses, kan jeg altid stole på at I er der. Til pigerne fra VB: Louise, Laura, Mobi og Anja, tak for altid at stille op når jeg kommer forbi København og at tage jer tid til at komme og besøge mig i Leiden. Til fysikpigerne: Bitten, Mette, Simone, AK, Turi, Pernille, Maria og Mathilde, jeg er ubeskriveligt glad for at I alle valgte fysikstudiet netop dét år og jeg ved, at selvom vi blev spredt for all vinde efter vores tid i København, er I aldrig længere væk end en skypebesked eller snapchat. At følge med i jeres dagligdag og at vide at I altid står klar med virtuelle kram giver mig en ubeskrivelig tryghed.

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