

# Lieke van Son

318 Beacon street, Somerville 02143 MA, USA

☎ (+1) 617-955 0730 | ✉ [lieke.van.son@cfa.harvard.edu](mailto:lieke.van.son@cfa.harvard.edu) | 🏠 [liekevanson.github.io](https://liekevanson.github.io) | 📺 /LiekeVanSon

## Education

### PhD candidate in Astronomy (Joint degree)

CENTER FOR ASTROPHYSICS | HARVARD & SMITHSONIAN – UNIVERSITY OF AMSTERDAM

*Cambridge, USA – Amsterdam, NL*

*Jan. 2019 - expected: spring 2023*

### MSc in Astronomy, Cosmology

LEIDEN UNIVERSITY

*Leiden, the Netherlands*

*Feb. 2016 - Awarded Jun. 2018*

### BSc in Astronomy

LEIDEN UNIVERSITY

*Leiden, the Netherlands*

*Sep. 2012 - Awarded Jun. 2016*

## Research Experience

### PhD candidate (joint degree)

*Cambridge MA, USA*

*Amsterdam, the Netherlands*

*Jan 2019 - present*

CENTER FOR ASTROPHYSICS | HARVARD & SMITHSONIAN – UNIVERSITY OF AMSTERDAM

Supervisors: Dr. S.E. de Mink, UvA/MPA - Garching. and Prof. C. Conroy, CfA - Harvard University

Subject: The massive stellar progenitors of gravitational wave sources

### Guest researcher as part of Pre-Doctoral Fellowship

*New York, USA*

CENTER FOR COMPUTATIONAL ASTROPHYSICS - SIMONS FOUNDATION

*Sep. 2021 - Oct. 2021*

Supervisor: Prof. Will Farr, Stony Brook University, USA

Subject: Understanding observed features in the black hole mass distribution

### International research visit

*Rio de Janeiro, Brazil*

OBSERVATÓRIO NACIONAL - RIO DE JANEIRO

*Mar. 2017 - Jun 2017*

Supervisors: Supervisors: Prof. Dr. H Röttgering and Dr. R. A. Overzier,

Subject: Probing radio galaxies with MG II absorbers

### MSc thesis research Project

*Leiden, The Netherlands*

LEIDEN UNIVERSITY

*Feb. 2016 - Dec. 2016*

Supervisors: Supervisors: Prof. Dr. J. Schaye and C. Barber Msc., Leiden University.

Subject: Overmassive Black Holes in the C-Eagle Simulation

## Grants & Awards

### Grants:

- International travel grant, the American Astronomical Society.
  - \$ 700,-, (Travel grant)
- The Leids Kerkhoven-Bosscha Fonds.
  - €1000,- (Student travel grant)
- Stichting Sterrenkundig Studiefonds, J.C.Kapteyn foundation
  - €200,- (Student travel grant)
- Oxford Hinze PhD fellowship (declined)
  - PhD scholarship (3.5 years, Oxford University )
- Janneke Fruin-Helb Grant
  - (Nominated for most exceptional grant proposal )
- Leids Universiteits Fonds
  - €1000,- (Student travel grant)

### Teaching awards

- **Distinction In Teaching:** Derek Bok Center for Teaching and Learning, Harvard University
- **Special Commendation:** *Extraordinary Teaching in Extraordinary Times:* Derek Bok Center for Teaching and Learning, Harvard University

## Research & Publications

---

### First-authored papers

- 11- **van Son, L. A. C.**; de Mink, S. E; Renzo, M.; Justham, S.; Zapartas, E.; Breivik, K. ; Callister, T. ; Farr, W. M. ; Conroy, C. Callister, T.; Justham, S.; *“No peaks without valleys: The stable mass transfer channel for gravitational-wave sources in light of the neutron star-black hole mass gap.”*, submitted to ApJ,(2022)
- 10- **van Son, L. A. C.**; de Mink, S. E; Callister, T.; Justham, S.; Renzo, M.; Wagg, T.; Broekgaarden, F. S.; Kummer, F.; Pakmor, R.; Mandel, I. *“The redshift evolution of the binary black hole merger rate: a weighty matter”*, ApJ, 931 17,(2022)
- 9- **van Son, L. A. C.**; de Mink, S. E; Broekgaarden, F. S.; Renzo, M.; Justham, S.; Laplace, E.; Morán Fraile, J. Hendriks, D. D.; R. Farmer, *“Polluting the pair-Instability mass gap with super-Eddington accretion in binary systems”*, ApJ, 897 100, (2020)
- 8- **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”*, MNRAS, 485 396, (2019)

### Co-authored papers

- 7- Ruediger Pakmor, (w/ 8 further co-authors including **van Son, L. A. C.**) *“Formation and fate of low-metallicity stars in TNG50”* MNRAS, 512 3602
- 6- Broekgaarden, F. S. et al., (w/ 11 further co-authors including **van Son, L. A. C.**), *“Impact of Massive Binary Star and Cosmic Evolution on Gravitational Wave Observations II: Double Compact Object Mergers”* (Submitted to ApJ) MNRAS, (2022)
- 5- Wagg, Tom ; Broekgaarden, Floor S. ; de Mink, Selma E. ; **van Son, Lieke A. C.** ; Frankel, Neige ; Justham, Stephen *“Gravitational wave sources in our Galactic backyard: Predictions for BHBH, BHNS and NSNS binaries detectable with LISA”* (Submitted to ApJ) arXiv:2111.13704
- 4- Naidu, Rohan P. (w/ 12 further co-authors including **van Son, L. A. C.**) *“Evidence from Disrupted Halo Dwarfs that r-process Enrichment via Neutron Star Mergers is Delayed by  $\geq 500\text{Myrs}$ ”* (2022) ApJL 926 L36
- 3- **COMPAS team** et al. (w/ 21 further co-authors including **van Son, L. A. C.**) *“Rapid stellar and binary population synthesis with COMPAS”* (2022) ApJS 258 34
- 2- Law-Smith, J., A., P.; Everson, R., W.; Ramirez-Ruiz, E.; de Mink, S., E.; **van Son, L. A. C.**; et al. (w/ 8 further co-authors) *“Successful Common Envelope Ejection and Binary Neutron Star Formation in 3D Hydrodynamics.”* (Submitted to ApJ) arXiv:2011.06630
- 1- Renzo, M.; Callister, T.; Chatziioannou, K.; **van Son, L. A. C.**; Mingarelli, C., M., F.; Cantiello, M.; Ford, K., E., S.; McKernan, B.; and Ashton, G., *“Prospects of gravitational-waves detections from common-envelope evolution with LISA”* ApJ, 919 128 (2021)
- Renzo, M.; Hendriks, D. D.; **van Son, L. A. C.**; Farmer, R. *“Pair-instability Mass Loss for Top-down Compact Object Mass Calculations”* Res. Notes AAS, 6 25

## Contributed and Invited talks and colloquia

---

*Jun. 2022* CONTRIBUTED TALK, CCA pre-doc symposium, CCA, New York, USA

*Jun. 2022* CONTRIBUTED TALK, Workshop on Black Hole Dynamics: From Gaseous Environments to Empty Space, NBIA, Denm.

*May. 2022* CONTRIBUTED TALK, (CANCELLED-COVID) Intermediate-Mass Black Holes, from Stellar Evolution to Cosmology, Puerto Rico

*Apr. 2022* ASTROPHYSICS SEMINAR (INVITED) Tel Aviv University, Israel

*Mar. 2022* ITC LUNCHEON, Departmental lunch talk, CfA Harvard University, USA. (recording of talk)

*Dec. 2021* CONTRIBUTED TALK, The Gravitational Wave Physics and Astronomy Workshop, Hannover, Ger.

*Dec. 2021* BLACK HOLE INITIATIVE COLLOQUIUM (INVITED) Harvard University, USA. (recording of talk)

*Dec. 2021* PHYSICS COLLOQUIUM (INVITED) State University of New York College, Geneseo, USA

*Dec. 2021* SCIENCE CALL, The Cosmic Explorer Consortium (online)

*Dec. 2021* GROUP MEETING, SeBa group, invited to discuss recent work (online)

*Nov. 2021* **OUTREACH SEMINAR**, Beacon Hill seminar series, “Unveiling the Cosmos”, Boston, MA, USA

*July 2021* **CONTRIBUTED TALK**, Max-Planck-Gesellschaft, Ringberg retreat, Kreuth, Germany

*July 2021* **CONTRIBUTED TALK**, European Astr. Society, Session 9: The Birth, Life, and Death of Black Holes, Leiden University, NL

*May 2021* **CONTRIBUTED TALK**, IAUS 361: Massive Stars Near & Far, Dublin, Ireland

*Apr. 2021* **TUFTS UNIVERSITY ASTRONOMY SEMINAR (INVITED)** Dep. of Physics and Astronomy, Tufts University, Boston, USA

*Mar. 2021* **CONTRIBUTED TALK**, VLT-FLAMES Massive Star consortium meeting, Heidelberg Institute for Theoretical Studies, Ger.

*Feb. 2021* **CONTRIBUTED TALK**, 43<sup>rd</sup> COSPAR Scientific Assembly, Sydney, Australia

*Oct. 2020* **BROWN BAG LUNCH TALK (INVITED)** Massachusetts Institute for Technology, Cambridge, MA, USA

*Aug. 2020* **ASTRONOMY SEMINAR (INVITED)** Dep. de Astronomia, Universidad de Concepción, Concepción, Chile

*Mar. 2020* **LUNCH TALK**, Inst. for Theory and Computation, Center for Astrophysics (Postponed due to Covid-19) , Cambridge, MA, USA

*Sep. 2020* **CONTRIBUTED TALK**, Annual meeting of the German Astronomical Society, Heidelberg, Ger.

*Dec. 2019* **LEAD DISCUSSION SESSION (INVITED)** titled “Black Holes in the Pair Instability mass gap”, Lorentz workshop, “The Origins of Black Hole Mergers and Gravitational Waves” , Leiden, NL

*Sep. 2017* **CONTRIBUTED. TALK**, The Young European Radio Astronomers Conference, Bologna, Italy

## Further Conferences/workshops attended

---

*May 2022* “IAUS 361: Massive Stars Near & Far”, Conference, Ballyconnell, Ireland

*Mar. 2022* “Bridging the Gap: Accretion and Orbital Evolution in Stellar and Black Hole Binaries”,  
invited as an affiliate - Kavli Institute for Theoretical Physics program, Santa Barbara, USA

*May 2021* “Gravitational-Wave Astrophysics for Early Career Scientists”, Lorentz Workshop, Leiden NL

*Oct. 2020* “AGN Disks: Where the wild Things Are” CCA - Flatiron Institute workshop, New York, USA

*Jan. 2020* “LISA astronomy sprint meeting”, CCA - Flatiron Institute workshop, New York, USA

*Jul. 2020* European Astronomical Society meeting, EWASS, *Poster presentation*, Leiden, NL

*Jun. 2019* “Exploring Compact-Object Binaries with Gravity and Light” KITP conference, UC Santa Barbara USA

*Jun. 2019* Science meeting for BlackGEM telescope array at the ESO La Silla Observatory , Nijmegen, NL

*May 2019* VLT-Flames Tarantula Survey (VFTS), general consortium meeting, Edinburgh, UK

*May 2019* “Electron-Capture-Initiated Stellar Collapse” Lorentz workshop, Leiden, NL

*Mar. 2019* “Multi-messenger physics and astrophysics with compact binaries,” PHAROS PhD Training School, Jena, GER

## Outreach and Public service

---

*April 2020 - present* **COMSciCON FLAGSHIP WORKSHOP | COMMUNICATING SCIENCE WORKSHOP** *Chair of local Organising Committee 2022*  
conference with the goal to empower future leaders in technical communication to share the results from research in their field to broad and diverse audiences, not just practitioners in their fields.

*Jul 2020 - present* **CFA INCLUSION, DIVERSITY & EQUITY ALLIANCE** *Member of accessibility subgroup.* The goal of the alliance is to improve equity, diversity, belonging, and inclusion through sustained actionable implementation.

*Jul 2020 - Aug 2020* **SPACEEU - SPACE IN YOUR LIVING ROOM** *Volunteer.* Online astronomy workshops for primary school children during the 2020 COVID-19 pandemic.

*April 2016 - Jun 2018* **VISITORS’ CENTRE EXHIBITION MANAGER, OLD OBSERVATORY, LEIDEN, THE NETHERLANDS** *Project Manager.* In charge of the development of a new exhibition for the astronomy visitors’ center.

*Jan 2015 - Apr 2015* **BRING THE SUN TO LEIDEN, LEIDEN UNIVERSITY** *Member of Public Relations Team.* Successful project with the goal of building a heliostat used for public outreach.

## Coding and other skills

---

### Astrophysical Codes

- COMPAS: COMPACT OBJECT MERGERS: POPULATION ASTROPHYSICS AND STATISTICS ([HTTP://COMPAS.SCIENCE](http://compas.science)) *Proficiency:* Advanced User and Co-developer, [Contributions as co-developer](#): Implemented several new physics modules and co-author on the method paper. COMPAS uses Git as the main tool for review and version control. The code is publicly available at <https://github.com/TeamCOMPAS/COMPAS>.
- MESA: MODULES FOR EXPERIMENTS IN STELLAR ASTROPHYSICS, ([HTTP://MESA.SOURCEFORGE.NET](http://mesa.sourceforge.net)) *Proficiency:* Applied for massive star and binary star science applications, able to run grids. Invited as Teaching assistant for the MESA summer school, but postponed.

### Computing

- PYTHON: *Proficiency:* This is the main language I use in all my analysis work. I coded several custom routines to simulate and analyze simulations for gravitational-wave progenitors. Advanced plotting and data visualization.
- C++: *Proficiency:* Intermediate proficiency. Main application in COMPAS code.
- FORTRAN: *Proficiency:* Basic working proficiency. Used when making adaptations to MESA.

## References

---

**Name:** Prof. Dr. S. E. de Mink  
**Institute:** Max Planck Institute for Astrophysics, Garching GER & UvA, Amsterdam NL  
**Connection** Primary PhD Thesis advisor  
**Contact** [sedemink@mpa-garching.mpg.de](mailto:sedemink@mpa-garching.mpg.de)

**Name** Prof. Dr. S. Justham  
**Institute** School of Astronomy & Space Science, (UCAS), Beijing CN  
**Connection** Co-advisor and collaborator  
**Contact** [s.justham@uva.nl](mailto:s.justham@uva.nl)

**Name** Prof. Dr. Charlie Conroy  
**Institute** Center for Astrophysics, Harvard, Cambridge USA  
**Connection** Advisor at Harvard  
**Contact** [cconroy@cfa.harvard.edu](mailto:cconroy@cfa.harvard.edu)

**Name** Prof. Dr. L. Hernquist  
**Institute** Center for Astrophysics, Harvard, Cambridge USA  
**Connection** Advisor at Harvard  
**Contact** [lhernquist@cfa.harvard.edu](mailto:lhernquist@cfa.harvard.edu)