# Siemen Burssens

PhD researcher,
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## Personal

My PhD research project gave me the opportunity to become an independent researcher by learning a variety of hard and soft skills. As a result, I am interested in all-things problem solving, and have the ability to learn new concepts and methods quickly. I am specifically interested in the extraction of knowledge from data sets for scientific, industrial, or commercial purposes.

## Key Skills

Python | numpy/pandas/matplotlib | Quantitative data analysis | MS Office | Git | Statistical modelling | LINUX | Data visualisation | Technical writing | Time management | Presentation skills

## Interests

- Physical sciences
- Problem solving
- Data science
- Statistical modelling
- Machine learning
- Science communication

## Profiles

# Education

## Postgraduate Studies

2018 – 2022 **PhD in Astronomy and Astrophysics** — **KU Leuven, Belgium**
**Thesis title**: Massive star asteroseismology with TESS and K2.
**Supervisors**: Dr. Dominic M. Bowman, Prof. Dr. Conny Aerts
**Degree obtained:** 4 July 2022.
**Link to thesis:** `https://tinyurl.com/3dbysvrv`

2017 – 2018 **M.Sc. in Medical Radiation Physics** — **KU Leuven, Belgium**
**Thesis title**: Knowledge-based treatment planning: a RapidPlan approach.
**Supervisors**: Ir. Msc. Tom Depuydt
**Grade:** 2:1

2015 – 2017 **M.Sc. in Astronomy and Astrophysics** — **KU Leuven, Belgium**
**Thesis title**: Molecular analysis of oxygen-rich AGB-star V1300 Aql.
**Supervisors**: Prof. Dr. Leen Decin, Dr. Taissa Danilovich.
**Grade:** 1st

## Undergraduate Study

2012 – 2015 **Bachelors degree in Physics** — **KU Leuven, Belgium**
with a minor in Biochemical Sciences

# Working experience

## Key projects

- *Analysis of Kepler/K2 space mission data in a search for variable stars (2018-2019).*
  In this project I set up a data extraction and processing pipeline in Python for time-series data of hundreds of stars obtained with the Kepler/K2 space telescope. This was followed by an exploratory analysis of the data in order to search for patterns linked to stellar properties. The project further included accessing and manipulating large databases.

  Resulted in the publication of a research article in the peer-reviewed scientific journal *Monthly Notices of the Royal Astronomical Society* (doi:10.1093/mnras/stz2165).

  Data processing | Data pipelines | Time-series data | Frequency analysis | Pattern recognition | Python | SQL

- *First scientific results of the novel TESS space mission telescope (2019-2020).*
  In this project I set up a framework to combine high-resolution spectroscopic data obtained from telescopes on the ground, with time-series photometric data from the recently launched TESS space telescope. The extraction of essential information from these data sets allowed for new evidence-backed insights into the evolution of stars more massive than our Sun.

  Resulted in the publication of a research article in the peer-reviewed scientific journal *Astronomy and Astrophysics* (doi:10.1051/0004-6361/202037700).

  Data processing | Time-series data | Scientific computing | Data visualisation | High performance computing | Python | R | Fortran

- *Statistical data modelling of neutron star progenitors (2020-2022).*
  In this project I developed up a statistical modelling framework to derive physical properties of neutron star progenitors. This included accessing large astronomy databases, the analyses of multiple data sets of different origins, simulations of stellar structure and evolution with high performance computing, and an in-depth statistical analysis using a variety of computational methods and algorithms.

  The results of this project are currently under peer-review.

  Data processing | Time-series data | Statistical modelling | Bayesian analyses | High performance computing | Python | R | Fortran | SQL

# Languages

**Dutch** (Native language)

**English** (IELTS Band score 7.5)

**French** (10 years at Sec. school)

**Italian** (Resident for 10 years)

**German** (2 years at Sec. school)

**Spanish** (Intro classes A1)

## Other experience

- **Experimental design and on-site observations with the Mercator telescope situated on the island of La Palma, Spain (2018-2022).**
  Principal investigator of observing programme 99, focused on the gathering of high-resolution spectroscopic data with the HERMES spectrograph mounted on the Mercator telescope (`http://www.mercator.iac.es`). Included two on-site observing runs of two weeks where I operated the telescope.

- **Member of the international IACOB project (2019-2022).**
  International collaborative project focused on the investigation and gathering of high-resolution spectroscopic data sets of massive stars in the Milky way.
  (`http://research.iac.es/proyecto/iacob/`).

- **Four years of teaching experience in undergraduate university programs (2018-2022).**
  This included courses on mechanics, electrodynamics, thermodynamics, and astronomy. The teaching duties involved the development of lesson plans, hands-on exercise sessions, mentoring students, and the design, supervision and correction of exams.

- **Scientific outreach through a variety of channels (2018-2022)**
  This included organising and participating in open science days at the university for young students aged 6 through 16, dedicated visits to local high schools, and writing online blogs and articles. These opportunities allowed me to build up communication skills on complex topics to a wide variety of audiences.

- **Speaker and participant at several international conferences (2021-2022)**.
  This included conferences organised by the European Astronomical Society (EAS), and the International Astronomical Union (IAU). These events allowed for hands-on experience with proper data visualisation, presentation skills, and public speaking in front of large audiences.

- **Member of the local organising committee of the TASC6/KASC13 Astronomy conference, Leuven, Belgium, 11-15 July 2022 (300 participants).**
  In this role I developed both organisational and managerial skills as part of a team.