

# NEIGE FRANKEL

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Current position: interim Post-Doc at MPIA after early PhD graduation

## EDUCATION

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PhD Astrophysics, IMPRS Heidelberg, Germany	2020
MSc degree of Astrophysics, Lund University, Sweden ( <i>passed with distinction</i> )	2017
BSc degree of Physics, Université Paul Sabatier, Toulouse, France ( <i>passed with distinction</i> )	2015

## RESEARCH

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### ***Forward Modelling the Secular Evolution of the Milky Way Disk*** 2017-21

PhD thesis, IMPRS Heidelberg. Advisor: Prof. Hans-Walter Rix

Data from spectroscopic surveys of stars and the Gaia space mission now can determine the distributions of stellar orbits, ages, and composition across our Milky Way, constraining its long-term dynamical evolution. However, astrophysical conclusions require the development and implementation of stringent forward-models for these large data sets of  $10^4 - 10^6$  stars, accounting e.g. for measurement uncertainties and selection effects. For my thesis I have set-up and successfully applied such a machinery, revealing strong orbit evolution across the Galaxy.

### ***Nucleosynthesis in Accretion Disks Around Black Holes*** 2016-17

[Master thesis](#), Lund University, Sweden. Advisor: Prof. Melvyn B. Davies

For my MSc thesis, I investigated whether accretion disks around black holes could contribute to the synthesis of elements. Nuclear fusion requires extreme conditions of temperature and density, and these conditions are only provided by very few systems. To investigate such systems in details, I have implemented an implicit integration scheme to solve the stiff differential equations involved in a network of nuclear reactions, and applied it to systems of accretions disks around black holes.

### ***Optimum Scheduling for Transit Timing Variations (TTV) Measurements*** Jun – Aug 2016

Summer Research Student, Lund University, Sweden. Advisor: Dr. Alexander J. Mustill

### ***The Effect of Binary Stars on the Space-velocity Distribution of Pulsars*** Jan– May 2015

BSc Internship, Lund University, Sweden. Advisor: Dr. Ross P. Church

## GRANTS, SCHOLARSHIPS & AWARDS

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Patzer Prize ( <i>for excellent publication at MPIA/ZAH</i> )	2020
IMPRS Scholarship Stipend ( <i>awarded to 2 students at IMPRS</i> )	2017
Erasmus grant ( <i>Erasmus agreement Toulouse-Lund created and signed under my initiation</i> )	2015
Bourse au Merite ( <i>Award for outstanding grades in Baccalaureate exam</i> )	2012

## REFEERED PUBLICATIONS

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### • 1st Author

**Frankel**, Sanders, Ting, Rix (2020), [Keeping it Cool: Much Migration, yet Little Heating, in the Galactic Disk](#), ApJ, 895, 15-34

**Frankel**, Sanders, Rix, Ting, Ness (2019), [The Inside-out Growth of the Galactic Disk](#), ApJ, 884, 99-116

**Frankel**, Rix, Ting, Ness, Hogg (2018), [Measuring Radial Orbit Migration in the Galactic Disk](#), The Astrophysical Journal, 865, 2, 96-115.

- **Contributing Author**

Eilers, Hogg, Rix, **Frankel** &3 (2020), [The Strength of the Dynamical Spiral Perturbation in the Galactic Disk](#), *ApJ*, 900,2, 186-206

Maire, Molaverdikhani, Desidera, Trifonov, Molliere, D’Orazi, **Frankel** &38 (2020), [Orbital and spectral characterization of the benchmark T-type brown dwarf HD 19467B](#), *A&A* 639, 1-26

Feuillet, **Frankel**, Lind, Frinchaboy, Garcia-Hernandez, Lane, Nitschelm, Roman-Lopez (2019), [Spatial variations in the Milky Way disc metallicity-age relation](#), *MNRAS*, 489, 2, 1742-1752

## TOOLS PUBLICLY AVAILABLE

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[APOGEE-DR14 selection function](#) with a [tutorial](#) of its use with practical examples

## TECHNICAL STRENGTHS

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Computer Languages	Python (current project), C++ (MSc thesis), Matlab (courses)
Editing/version control	Vim, Gedit, Latex, Gnuplot, git
Codes & Packages used	PyTorch (Artificial neural nets in Python – used in published work) Galpy, AGAMA (galactic dynamics, used in published work) BSE, TTVFast (used in research projects) RADMC, Zeltron, RAMSES (1-day training each in Astrosim 2017)

## TRAINING, SUMMER SCHOOLS & HANDS-ON WORKSHOPS

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Ringberg workshop, Germany – <i>Machine Learning in Astronomy</i>	2019
Shanghai, China – <i>Gaia-LAMOST hack-a-thon</i>	2018
Heidelberg, Germany – <i>Gaia data &amp; science summer school</i>	2018
Flatiron institute, New York, USA – <i>Gaia Sprint</i>	2018
Penn-State, USA – <i>Astrostatistics summer school</i>	2018
Moletai Observatory, Lithuania – <i>Euoplanet international research summer school</i>	2017
Ecole Normale Supérieure de Lyon, France – <i>Astrosim: Numerical Astrophysics</i>	2017
University of Savoie, France – <i>Particle physics, gravitational waves, CERN</i>	2016
Universities of Orsay and Saclay, Paris, France – <i>Astroparticle physics, cosmology</i>	2015

## TALKS & SEMINARS

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Galaxy Harvard group meeting – <i>What sets the radial structure of the Milky Way Disk?</i>	2020
EAS virtual meeting – <i>Measuring Radial Migration with Gaia and APOGEE</i>	2020
Aarhus, virtual seminar – <i>Seeing the Galactic Disk Evolve with Red Clump Stars</i>	2020
Birmingham, Stars Group meeting – <i>What Sets the Radial Structure of the Galactic Disk?</i>	2020
Cambridge UK, IoA, Galaxy Evolution Discussion Seminar – <i>Seeing the Milky Way Disk Evolve</i>	2020
Cambridge UK, IoA, MW meeting – <i>Modelling the Disk: Dynamics, Chemistry &amp; Supernovae</i>	2020
Heidelberg, MPIA seminar – <i>The Dynamical Evolution of the Milky Way Disk is Cool</i>	2020
Paris Observatory, <a href="#">GEPI seminar</a> – <i>Seeing the Milky Way Disk Evolve</i>	2019
Stuttgart <a href="#">AG meeting</a> – <i>Building a Global Model for the Secular Evolution of the Galactic Disk</i>	2019
Lund Observatory, whiteboard talk– <i>Evolution of Galaxy Disks: What the MW Can Do for You</i>	2019
Kloster Schöntal, MPIA retreat– <i>How to Make a Galaxy Disk in Three Steps: the Milky Way</i>	2019
Shanghai, <a href="#">The Life and Times of the Milky Way</a> – <i>Measuring Radial Migration in the MW Disk</i>	2018
Besancon, APOGEE2 meeting – <i>Obtained Direct Measure of Radial Migration with APOGEE</i>	2018
Lund, <a href="#">‘Dynamical Universe for All’</a> – <i>What Sets the Radial Structure of the Milky Way Disk?</i>	2018
Heidelberg MPIA, seminar – <i>What Sets the Radial Structure of the Milky Way Disk?</i>	2018
Lund University, MSc defence – <i>Nucleosynthesis in Accretion Disks Around Black Holes</i>	2017
Lund Observatory, whiteboard talk – <i>Optimum Scheduling for TTV Measurements: WASP-47</i>	2016
Toulouse, BSC Talks– <i>The Effect of Binarity on the Space-velocity Distribution of Pulsars</i>	2015

## STUDENT SUPERVISION

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BSc student Audrey Destarac co-supervised with Hans-Walter Rix <i>Characterizing observational orbital signatures of black hole – star binaries</i>	2019
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## TEACHING

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### Academic teaching / tutoring

<i>Introduction to Astronomy and Astrophysics</i> Tutor, Heidelberg University	WS 2019-20
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### Individual teaching / support / preparation to competitive exams (France)

<i>Physics &amp; Chemistry</i> focused preparation for science baccalaureate (high school, successful)	2014-15
<i>Mathematics</i> weekly support of middle school student in need	2012-15
<i>Physics</i> support for technical baccalaureate (high school) student	2014
<i>Chemistry</i> specific preparation for vocational baccalaureate (high school, successful exam)	2013

## PUBLIC OUTREACH

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Founder & President of <a href="#">ALVA Student Astronomy Club</a> , Lund University, Sweden	2015-16
Volunteer at Kulturnatten (Culture Night), Lund Observatory, Sweden	2015-16
Vice-president of <a href="#">UPS in Space Student Astronomy Club</a> , Toulouse University, France	2014

## COMMUNITY INVOLVEMENT

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Administrator in the social media group ‘Early Career Astronomers & Astrophysicists’	2019-....
Annual talk promoting scientific studies, High school Lycee Pierre d’Aragon, France	2013-18
Student ambassador in Astronomy, Lund University, Sweden	2016-17
Student volunteer at annual INFOSUP exhibition (choice of study/career) Toulouse, France	2012-14
Initiation of an Erasmus Agreement Toulouse, France - Lund, Sweden	2015

## UNIVERSITY / DEPARTMENTAL SERVICE

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LOC Galdark meeting, Heidelberg, Germany	2017
Initiator and organiser at Lund University, Sweden:	2015-16
- Meeting MSc – PhD students: PhD applications, experience and career choices	
- Workshop and hacking session with fellow MSc students: <i>Computing</i>	
- Workshop and hacking session with fellow MSc students: <i>Statistics</i>	