

# Tjitske Starkenburg

Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA)  
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## Academic biography

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<b>Research Assistant Professor</b>	<b>Northwestern University</b> 2023–current
<b>CIERA Postdoctoral Fellow</b> Center for Interdisciplinary Exploration and Research in Astrophysics Independent postdoctoral fellowship	<b>Northwestern University</b> 2019–2023
<b>Flatiron Research Fellow</b> Center for Computational Astrophysics Independent postdoctoral fellowship	<b>Flatiron Institute</b> 2016–2019
<b>PhD Astronomy</b> June 24 2016, <i>The impact of dark satellites on dwarf galaxies in a <math>\Lambda</math>CDM universe</i> Advisor: Prof. Dr. A. Helmi	<b>University of Groningen</b> 2011–2016
<b>MSc Astronomy, Cum Laude ~ top 5–10%</b> Master thesis: <i>On dwarf galaxies and dark satellites</i> Advisor: Prof. Dr. A. Helmi	<b>University of Groningen</b> 2009–2011
<b>BSc Astronomy &amp; BSc Mathematics</b> Bachelor thesis: <i>Classifying galaxies with mathematical morphology</i> Advisors: Prof. Dr. S.C. Trager (astronomy), Dr. M.H.F. Wilkinson (computer science) & Prof. Dr. G. Vegter (mathematics)	<b>University of Groningen</b> 2005–2009

## Research Interest

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My research answers fundamental questions on the evolution of galaxies, by combining **galactic dynamics** and **extragalactic astronomy**. I aim to understand how galaxies, including their lower-mass satellites and stellar halos, evolve under the non-linear combination of many internal and external physical processes, and to **unravel how observed properties connect to galaxy formation history**.

My research covers analyzing **galaxy populations**, including anomalous galaxies, in large-scale and zoom cosmological models and observational samples, and the **development of theoretical models** and **techniques to build synthetic observations**. I make use of **statistical and machine learning approaches** to connect observational data to theoretical constraints, and study how these tools can support gains in physical understanding.

## Prizes and grants

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<b>Co-I on selected NASA Roman Large Wide Field Science Program</b> Proposal title: <i>Roman Infrared Nearby Galaxies Survey</i> PI: B. Williams, University of Washington; 10 Co-Is	<b>NASA</b> 2023
<b>Co-I on selected NASA Roman Regular Wide Field Science Program</b> Proposal title: <i>A new theoretical framework for globular cluster science with the Roman Wide-Field Imager</i> PI: Robyn Sanderson, University of Pennsylvania; 2 Co-Is	<b>NASA</b> 2023
<b>Co-I on funded Archival Cycle 30 Hubble Space Telescope Program</b> Proposal title: <i>Augmenting the SFR-M* Plane with Galaxy Star Formation History Trajectories</i> Contributed significantly on the proposal part comparing observations and theory	<b>NASA</b> 2022
<b>PI on an observing proposal for Northwestern time on the MMT</b> Proposal title: <i>Reconstructing the assembly history of M31</i>	<b>Northwestern University</b> 2022 and 2023
<b>Kavli Institute for Theoretical Physics Program Winter 2023</b> <i>Building a Physical Understanding of Galaxy Evolution with Data-driven Astronomy</i> Initiated and led a proposal for a 10-week KITP program, granted during a particularly competitive year for astronomy	<b>KITP</b> 2021

## Multiple travel grants

Leids Kerkhoven-Bosscha Fund  
2011-2016

## National Academic Award for the Kapteyn Institute Team on The infrared universe

Netherlands Organization for Scientific Research  
2008

- o National award for the best science outreach project with national scope: €100 000 to implement the proposed project
- o I was an active member of the team and contributed to the winning presentation

## "Betabeurs" Scholerschip

Dutch Ministry for Science and Education

Scholarship for top students in Mathematics, cohorts starting 2004 and 2005

2007

Amount: €1500

## Prize in Mathematics

International Conference for Young Scientists

2<sup>nd</sup> Prize for presenting my own research project

2005

Out of a selection of > 100 high school students from 14 different countries

## Jan Kommandeur's prize

University of Groningen

3<sup>rd</sup> Prize in a competition for the best high school research project of the Netherlands

2005

## Leadership experience

### Director of the IDEAS traineeship program

Northwestern University

Graduate traineeship and certificate program

2023–current

Integrated Data-driven discovery in Earth and Astrophysical Sciences; <https://www.ideas.ciera.northwestern.edu>

### Lead Coordinator, Kavli Institute for Theoretical Physics Program Winter 2023

KITP

Organizing and leading a 10-week KITP program: [www.kitp.ucsb.edu/activities/galevo23](http://www.kitp.ucsb.edu/activities/galevo23)

2021–2023

the program will be partially remote, 4-weeks in-person at KITP, and 1 week at CCA, leading to unique organizational challenges

### Co-director of the CIERA REU summer program

Northwestern University

Co-running a NSF REU summer program for 14 undergraduates

Summer 2022

The program includes a variety of professional development workshops: <https://sites.northwestern.edu/cierareu/>

### PI of the Isolated and Quiescent galaxies (IQ) Collaboratory<sup>1</sup>

IQ-collaboratory

collaboration of ~30 astronomers, with currently 3 active multi-paper projects

2017–current

comparing simulated and observed galaxy populations to learn about quenching processes

### Co-leader of the synthetic observations working group

SMAUG<sup>2</sup>

Simulating Multiscale Astrophysics to Understand Galaxies (SMAUG) Collaboration

2017–2022

~40 experts from 7 institutions in the USA and Europe

### Organizing the Tristate Postdoc Retreat 2018

Flatiron Institute

2-day career oriented workshop for all astronomy postdocs within the wider New York area

2018

Independently thought out and planned the program, including workshops on both academic and non-academic careers,

Decadal Survey brainstorm sessions, panel discussions, and lightning talks

### Co-organizing astro-ph meetings at the Center for Computational Astrophysics

Flatiron Institute

2018

### Chair, Organizing Committee Study Trip

Student association for Physics and Mathematics

Organizing a three-week study trip

2008–2009

- o visiting Universities, Institutes, and Companies in Brazil and Argentina

- o for 25 students and 2 staff members of the University of Groningen; Total budget: €70,000

### Vice-Chair, Faculty Council, Faculty of Mathematics and Natural Sciences

University of Groningen

The Council is the official representative advisory body to the Executive Board of the Faculty

2007

## Teaching and mentoring experience and training

### Co-lead of the CIERA Mentoring Action Team

CIERA

Developing a flexible, extended mentoring network for CIERA

2021–current

where anyone can serve as mentor to their peers or juniors and everyone can request multiple mentors from different roles.

### Member of the CIERA Bridge Program and Mentoring Task Force

CIERA

Leading the development of a Mentoring Survey for all of CIERA and the report on the survey results

2020–2021

<sup>1</sup><http://iqcollaboratory.github.io>

<sup>2</sup><https://www.simonsfoundation.org/flatiron/center-for-computational-astrophysics/galaxy-formation/smaug/>

Also attended multiple mentoring trainings to keep learning myself.

<b>CIRTL Research Mentor Training</b> 11-week Evidence-based Course on Research Mentoring Including discussions and exercises that address key concerns and challenges identified by experienced research mentors	<b>CIRTL</b> 2021
<b>Mentoring an undergraduate student for the CIERA REU program</b> Primary advisor, co-mentoring with Prof. Claude-André Faucher-Giguère and Dr. Sarah Wellons also co-advised another REU student.	<b>CIERA</b> 2021
<b>Lecturing at the CCA Dynamics Summer School 2021</b> 15-20min lectures on the galaxy as an equilibrium system, and the galaxy as a collection of orbits One of 5 lecturers for the school.	<b>Flatiron Institute</b> 2021
<b>Mentoring graduate students in the CCA Dynamics Summer School 2021</b> Primary advisor/co-advisor on multiple 5-week projects All projects I was involved in are continuing, and are expected to lead to publications.	<b>Flatiron Institute</b> 2021
<b>CIRTL online course <i>Advancing Learning through Evidence-Based STEM Teaching</i></b> Also participated a Learning Community connected to the course. Course includes developing well-defined, measurable, achievable and student-centered learning goals and objectives, and designing instructional practices and materials that align with those	<b>CIRTL</b> 2021
<b>Subject-specific tutor for Northwestern Prison Education Program (NPEP)</b> Tutoring for 2 classes during 2 quarters: Introductory Physics and Introductory Astronomy	<b>Northwestern University</b> 2021
<b>CIRTL online course <i>An Introduction to Evidence-Based Undergraduate STEM Teaching</i></b> Also participated a Learning Community connected to the course Course included developing learning goals and objectives, assessments, and teaching plans	<b>CIRTL</b> 2020
<b>Interactive virtual workshop for High School students doing Summer Research Projects</b> One-time workshop on Galaxy Mergers where students made their own movies of merger simulations Workshop jupyterLab notebook and necessary data available on github	<b>CIERA</b> 2020-2021
<b>Mentoring graduate student in the Kavli Summer School 2018</b> <i>6-week project on outside-in quenching galaxies</i> ; Co-mentor with Dr. Stephanie Tonnesen (CCA) The project led to two published refereed papers: Starkenburg et al. 2019 and Kopenhafer et al. 2020	<b>Flatiron Institute</b> 2018
<b>Math tutoring for Public School children with <i>The Reading Team Math Program</i></b> <i>Teaching math to kindergarten and 1st grade students and developing materials that are fun and educational</i> led by Prof. Dr. Hui from Columbia University <a href="https://sites.google.com/view/readingteammath">https://sites.google.com/view/readingteammath</a>	<b>New York</b> 2017
<b>Mentoring CUNY undergrad Summer student</b> <i>Project on black holes in dwarf galaxy mergers</i> ; Co-mentor with Prof. Dr. Jillian Bellovary (CUNY) The student has presented results at SACNAS and AAS meetings (Mercedes-Feliz, Starkenburg & Bellovary in prep.)	<b>Flatiron Institute</b> 2017
<b>Teaching Assistant</b> <i>For multiple courses on Introductory Astronomy and Observational Astronomy</i> Including teaching exercise classes, grading homework, and mentoring and teaching students during observation runs at the Isaac Newton Telescope (INT), La Palma, and the Blaauw Observatory, University of Groningen	<b>University of Groningen</b> 2010–2013
<b>Mentoring high school students in research projects</b> <i>Including developing and teaching various outreach activities, masterclasses, and workshops</i>	<b>University of Groningen</b> 2006–2011

## Scientific experience

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### Selected Seminar Talks.....

- o Cosmology Seminar, University College London, **Invited Seminar**, April 2022
- o Physics Colloquium, Drexel University, **Invited Colloquium**, February 2022
- o Universities Space Research Association SOFIA team, **Invited Seminar**, March 2021
- o Michigan State University astrophysics group, **Invited Seminar**, December 2020
- o Canadian Institute for Theoretical Astrophysics, **Invited Seminar**, May 2019
- o Institute for Theory and Computation, Center for Astrophysics, Harvard, **Invited Seminar**, March 2019
- o Space Telescope Science Institute Galaxy Journal Club, November 2018
- o Columbia University Thursday Seminar, April 2018

- New York University Astrophysics Seminar, September 2017
- Yale University lunch Seminar, February 2017
- Rutgers University lunch Seminar, February 2017
- University of California Riverside Astronomy Seminar, January 2017
- ESO lunch seminar, May 2016
- MPA Cosmology Seminar, May 2016

### Selected Talks at Conferences

- *KITP Conference: Galaxy Formation and Evolution in the Data Science Era*, Santa Barbara, March 2023, **Invited talk**
- *Galaxy Evolution with the Euclid Mission and ESO Telescopes*, Madrid, October 2022
- *Illuminating Galaxy Formation with Ancient Globular Star Clusters and Their Progenitors*, Aspen, March 2022
- *Spergelfest: Celebrating the 60th birthday of David Spergel and the 5-year Anniversary of CCA*, Princeton-CCA, October 2021, **Invited talk**
- *Multi-Object Spectroscopy for Statistical Measures of Galaxy Evolution*, virtual, STScI, May 2021
- *Linking the Galactic and the Extragalactic*, virtual, ASTRO-3D, December 2020
- *The Epoch of Galaxy Quenching*, virtual, KICC, September 2020
- *Quenching and Transformation Throughout Cosmic Time*, Aspen Center for Physics, February 2020
- *In the Balance: Stasis and Disequilibrium in the Milky Way*, KITP Santa Barbara, April 2019, **Invited talk**
- *The life and death of star-forming galaxies*, ICRAR, Perth, Australia, March 2019, Contributed talk
- *The Physics of Galaxy Scaling Relations and the Nature of Dark Matter*, Kingston, Canada, July 2018
- *KIAA Forum on Gas in Galaxies: star formation and quenching*, Beijing, China, June 2018
- *The role of gas in galaxy dynamics*, Malta, October 2017
- *13th Potsdam Thinkshop: Near field cosmology*, Obergurgl, Austria, March 2016
- *European Week of Astronomy and Space Science: The journey of dwarf galaxies*, Tenerife, Spain, June 2015
- *The life and death of satellite galaxies*, Leiden, the Netherlands, April 2015
- *11th Potsdam Thinkshop: Satellite galaxies and dwarfs in the Local Group*, Potsdam, Germany, August 2014

### Referee responsibilities

- Referee for PRL, MNRAS; AAS journals; A&A
- Proposal reviewer for NSF, NASA, two National Science Foundations
- Reviewing applications for CCA Dynamics Summer School 2020 and 2021, REU programs at CCA and CIERA

### Outreach experience

<b>Invited lecture at Amateur Astronomers Inc.</b>	<b>Cranford, New Jersey</b> November 2019
<b>Invited lectures for amateur astronomers, high school students, specific groups and general public</b> <i>Including a video interview for ScienceLinx, the University of Groningen science outreach center</i>	2011–2016
<b>Lecturer and volunteer at the Blaauw Observatory Open Nights</b> <i>Presenting public lectures, quizzes, and experiments for young audiences, assisting the organization</i>	<b>Groningen</b> 2008–2016
<b>Interview in <i>Zenit</i>, the magazine for astronomy enthusiasts in the Netherlands</b>	September 2015
<b>Evening for Science and Society</b> <i>Meeting that fosters interaction between leading figures in science, industry, politics, and culture</i> Accompanying Amina Helmi, who was invited accompanied by a young scientist of her choice	<b>The Hague</b> October 2015
<b>Invited Talk at the National Conference for Physics Teachers</b>	<b>Noordwijk</b> December 2013
<b>National outreach activities on the <i>Infrared Universe</i></b> <i>After winning the National Academic Award for best science outreach project with the Kapteyn Institute team</i>	2009