

Antranik A. Sefilian

THEORETICAL ASTROPHYSICIST · PHD · CURRICULUM VITAE

Office 107, AIU, Friedrich-Schiller-Universität, Schillergäßchen 2-3, Jena, Thüringen, 07745, Germany

☎ +49 3641 9 47529 | ✉ sefilian.antranik@gmail.com | 🆔 0000-0003-4623-1165 | 🌐 www.antraniksefilian.com

Research Interests

Astrophysical dynamics, with a focus on the formation, evolution, and architecture of planetary systems, both solar and extrasolar.

Keywords: Exoplanets; Debris discs; Planet-disc interactions; Self-gravitating discs/rings; Celestial mechanics; Dynamics & simulations.

Positions

Alexander von Humboldt Postdoctoral Fellow

ASTROPHYSIKALISCHES INSTITUT UND UNIVERSITÄTS-STERNWARTE, FRIEDRICH-SCHILLER-UNIVERSITÄT JENA.

Jan. 2023 — present

Jena, Germany

Postdoctoral Research Affiliate (REMOTE)

DEPARTAMENTO DE FÍSICA, UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA.

Apr. 2022 — Aug. 2022

Valparaíso, Chile

Visiting Researcher

CENTER FOR ADVANCED MATHEMATICAL SCIENCES, AMERICAN UNIVERSITY OF BEIRUT.

Aug. 2021 — Aug. 2022

Beirut, Lebanon

Education

Ph.D. in Applied Mathematics and Theoretical Physics

UNIVERSITY OF CAMBRIDGE. Awarded with no corrections

Oct. 2017 — May 2022

Cambridge, UK

M.Sc. in Physics

AMERICAN UNIVERSITY OF BEIRUT. GPA: 4.0/4.0 – Summa Cum Laude.

Sep. 2014 — Jul. 2017

Beirut, Lebanon

B.Sc. in Physics

LEBANESE UNIVERSITY. GPA: 82.56/100 – Summa Cum Laude.

Oct. 2011 — Jun. 2014

Beirut, Lebanon

Awards, Fellowships & Scholarships

Humboldt Research Fellowship for Postdoctoral Researchers, ALEXANDER VON HUMBOLDT FOUNDATION

2023 — 2025

Research fellowship awarded to international scientists to carry out a long-term research project in Germany.

German Language Scholarship, ALEXANDER VON HUMBOLDT FOUNDATION

Sep. 2022 — Dec. 2022

Full funding for an intensive 4-month language course at the Goethe-Institut in Dresden, Germany.

Gates Cambridge Scholarship, GATES CAMBRIDGE FOUNDATION

2017 — 2022

Full funding of PhD studies. Awarded to ~ 1% of applicants. First physics and astrophysics scholar from Lebanon.

Graduate Fellowship, AMERICAN UNIVERSITY OF BEIRUT

2014 — 2017

Full funding of graduate (Master's) studies.

Award of Excellence, LEBANESE UNIVERSITY

2012, 2013, & 2014

Ranked first of my class over 3 years of undergraduate studies.

Publications

LEGEND: † = STUDENT-LED PAPER

FIRST AUTHOR OR STUDENT-LED

1. **Sefilian, A. A.**, Rafikov, R. R., & Wyatt, M. C., 2023, "Formation of gaps in self-gravitating debris disks by secular resonance in a single-planet system. II. Towards a self-consistent model", *The Astrophysical Journal*, *submitted*.
2. † Best, S., **Sefilian, A. A.**, & Petrovich, C., 2023, "The influence of cold Jupiters in the formation of close-in planets. I. planetesimal transport", *The Astrophysical Journal*, *submitted*, arXiv: 2304.02045 — [\[Link\]](#)
3. **Sefilian, A. A.**, Rafikov, R. R., & Wyatt, M. C., 2021, "Formation of gaps in self-gravitating debris disks by secular resonance in a single-planet system. I. A simplified model", *The Astrophysical Journal*, 910, 13 — [\[Link\]](#)

4. **Sefilian, A. A.**, & Rafikov, R. R., 2019, “Potential softening and eccentricity dynamics in razor-thin, nearly Keplerian discs”, Monthly Notices of the Royal Astronomical Society, 489, 4176 — [\[Link\]](#)
5. **Sefilian, A. A.**, & Touna, J. R., 2019, “Shepherding in a self-gravitating disk of trans-Neptunian objects”, The Astronomical Journal, 157, 59 — [\[Link\]](#)

SECOND AND THIRD-AUTHOR

6. Farhat, M. A., **Sefilian, A. A.**, & Touna, J. R., 2023, “The case of HD 106906 debris disc: A binary’s revenge”, Monthly Notices of the Royal Astronomical Society, 521, 2067 — [\[Link\]](#)

NTH-AUTHOR

7. Olofsson, J., Thébault, P., Kral, Q., et al. including **Sefilian, A. A.**, 2022, “The vertical structure of debris discs and the impact of gas”, Monthly Notices of the Royal Astronomical Society, 513, 713 — [\[Link\]](#)

DISSERTATIONS

8. **Ph.D. Thesis**, “Secular dynamics of self-gravitating debris discs” — [\[Link\]](#) 2022
University of Cambridge, Supervisor: Prof. Roman R. Rafikov
9. **M.Sc. Thesis**, “From planetesimal discs in wide binaries to the outer-remnants of planet formation: variations on the dynamics of small bodies with big companions” — [\[Link\]](#) 2017
American University of Beirut, Supervisor: Prof. Jihad R. Touna

Observing Proposals

JWST

- **Cycle 1**, “Searching for Low Mass Planets in Debris Disk Gaps” — [\[Link\]](#) 2021
PI: S. MARINO – ALLOCATED TIME: 11 HOURS – ID: 1668

ALMA

- **Cycle 9**, “The ALMA survey to Resolve exoKuiper belt Substructures (ARKS)” 2022
PI: S. MARINO – ALLOCATED TIME: 150 HOURS – ID: 2022.1.00338.L – GRADE: A

Conferences and Talks

LEGEND: † = INVITED; * = VIRTUAL (VIA ZOOM)

CONTRIBUTED TALKS

1. **Debris Discs at Home and Abroad**, Friedrich-Schiller-Universität Jena, Germany Sep. 2022
2. ***Annual Meeting of the European Astronomical Society**, Leiden, The Netherlands Jun. 2021
3. ***Cambridge Exoplanet and Life Day**, University of Cambridge, UK Jun. 2021
4. ***Division on Dynamical Astronomy (DDA/AAS)**, Meeting #52 — [\[Link\]](#) May 2021
5. ***American Astronomical Society**, Meeting #237 Jan. 2021
6. **Triple Evolution and Dynamics 2**, Lorentz Center, Leiden, The Netherlands Sep. 2018

SEMINARS AND COLLOQUIUM

1. **Astrophysics Group Meeting** of Prof. Cristobal Petrovich, Pontificia Universidad Católica de Chile, Chile Apr. 2023
2. **Astrophysics Seminar**, AIU, Friedrich-Schiller-Universität Jena, Germany Feb. 2023
3. **Dust, Small Bodies, and Planets Seminar**, AIU, Friedrich-Schiller-Universität, Jena, Germany Jan. 2023
4. ***NPF Astrophysics Seminar**, Universidad de Valparaíso, Valparaíso, Chile Jul. 2022
5. †***Astrophysics Group Meeting** of Prof. Norman Murray, Canadian Institute for Theoretical Physics, Canada Nov. 2020
6. †***Debris Discs Seminar**, AIU, Friedrich-Schiller-Universität Jena, Germany Nov. 2020
7. **Darwin Science Lunchtime Seminar Series**, University of Cambridge, UK Jan. 2019
8. **DAMTP Astrophysics Lunch Seminar**, University of Cambridge, UK Nov. 2018
9. **DAMTP Astrophysics Lunch Seminar**, University of Cambridge, UK Feb. 2018

POSTERS

1. **Network Meeting of the Alexander von Humboldt-Foundation**, Johannes Gutenberg University Mainz, Germany Apr. 2023
2. ***(Exo)Planet Diversity, Formation and Evolution**, PFE-SPP1992 joint meeting, Berlin, Germany Sep. 2022
3. ***Planet-forming Disks: From Surveys to Answers**, Lorentz Center, Leiden, The Netherlands Sep. 2021
4. ***Circumstellar Disks and Young Planets**, 2021 Sagan Exoplanet Summer Virtual Workshop Jul. 2021
5. ***Distorted Astrophysical Discs**, Cambridge, UK May 2021
6. ***Division on Dynamical Astronomy (DDA/AAS)**, Meeting #52 — [\[Link\]](#) May 2021
7. ***Triple Evolution and Dynamics 3**, Northwestern University, USA — [\[Link\]](#) Mar. 2021
8. **UK Exoplanet Community Meeting**, Imperial College London, UK Apr. 2019
9. **Triple Evolution and Dynamics 2**, Lorentz Center, Leiden, The Netherlands Sep. 2018
10. **Exoplanets II**, Cambridge, UK — [\[Link\]](#) Jul. 2018

Advising and Mentoring Experience

PHD STUDENTS

- **Sergio Best**, Pontificia Universidad Católica de Chile Aug. 2021 — present
Co-ADVISOR, SUPERVISOR: PROF. CRISTOBAL PETROVICH Santiago, Chile
Project: “The influence of cold Jupiters in the formation of close-in planets”

Teaching Experience

Teaching Assistant, American University of Beirut, Lebanon Sep. 2016 — Jan. 2017

COURSES: CLASSICAL MECHANICS FOR UNDERGRADUATES; CLASSICAL MECHANICS FOR GRADUATES.

Duties: giving weekly break-out session lectures to two groups of ~ 20 students, grading problem sets.

Physics Lab Instructor, Lebanese American University, Lebanon Feb. 2015 — Jun. 2017

COURSES: MECHANICS FOR FRESHMAN STUDENTS; ELECTRICITY & MAGNETISM; CLASSICAL PHYSICS FOR LIFE SCIENCES; MODERN PHYSICS FOR LIFE SCIENCES.

Duties: preparing lab experiments, giving weekly lectures, grading lab reports, designing and grading exams. Overall $\gtrsim 200$ students.

Physics Lab Instructor, American University of Beirut, Lebanon Sep. 2014 — Jan. 2017

COURSES: MODERN PHYSICS FOR LIFE SCIENCES; INTRODUCTORY PHYSICS II FOR ENGINEERS & PHYSICISTS.

Duties: preparing lab experiments, giving weekly lectures, grading lab reports and exams. Overall $\gtrsim 200$ students.

Service & Affiliations

Referee, The Astrophysical Journal Letters (ApJL) 2023 —

Referee, Monthly Notices of the Royal Astronomical Society (MNRAS) 2021 —

Referee, The Astrophysical Journal (AJ) 2019 —

Member, European Astronomical Society (EAS) 2018 —

Fellow, Royal Astronomical Society (RAS) 2018 —

Schools & Workshops Attended

Five Years After HL Tau: A new era in planet formation, virtual conference Dec. 2020

Planetesimal Formation Meeting, virtual workshop Nov. 2020

Rocky Worlds: from the Solar System to Exoplanets, University of Cambridge, UK Jan. 2020

Plato Theory Workshop, University of Cambridge, UK Dec. 2018

NBIA Summer School on Protoplanetary Disks and Planet Formation, Niels Bohr Institute, Denmark Aug. 2015

Particle Physics Workshop, American University of Beirut, Lebanon – organized by CERN Apr. 2015

Public Outreach & Media Coverage

Public Talk, “LET’S TALK ASTROPHYSICS”, Badguer Cultural Center, Lebanon Jun. 2022

AAS NOVA Feature , “AN ALTERNATIVE TO PLANET NINE” (SEFILIAN & TOUMA 2019) — [LINK]	Dec. 2019
Featured for being one of the most downloaded papers published in AAS journals in 2019	
Press Release , “MYSTERY ORBITS IN OUTERMOST REACHES OF SOLAR SYSTEM NOT CAUSED BY PLANET NINE” — [LINK]	Jan. 2019
Articles on the science results from Sefilian & Touma (2019) were published in Astronomy Magazine, American University of Beirut, Gizmodo, Nature ME, NewScientist, Popular Science, Space.com, Space Daily, The Telegraph, Universe Today, etc.	
Public Talk , “PLANET NINE: TO BE OR NOT TO BE”, ZOMTalks: Space - Exploring Different Perspectives, Lebanon	Jun. 2019
Magazine Article , “MYSTERY AT THE EDGE OF OUR SOLAR SYSTEM”, The Scholar Magazine, Gates Cambridge Trust — [LINK]	May 2019
Podcast , “PLANET 9, APOLLO 9 AND AURORA ADVENTURES”, Radio Astronomy, BBC Sky at Night Magazine, UK	Mar. 2019
Public Talk , “A JOURNEY TO THE STARS”, Badguer Cultural Center, Lebanon	Jul. 2017
Radio Interview , “A JOURNEY TO THE STARS”, Radio Voice of Van, Lebanon	Jun. 2017

IT Skills & Languages

Computer Languages	MATLAB, Python, \LaTeX , HTML
Modelling Software	Rebound
Armenian (native speaker) – Arabic (native speaker) – English (fluent, TOEFL iBT: 107, 2017) – German (CEFR Level B1, Goethe-Institut, 2022) – Turkish (fluent)	

References

Prof. Dr. Alexander V. Krivov	AIU, FRIEDRICH-SCHILLER-UNIVERSITÄT JENA, GERMANY	✉ krivov@astro.uni-jena.de
Prof. Roman R. Rafikov	DAMTP, UNIVERSITY OF CAMBRIDGE, UK	✉ rrr@damtp.cam.ac.uk
Prof. Mark C. Wyatt	IOA, UNIVERSITY OF CAMBRIDGE, UK	✉ wyatt@ast.cam.ac.uk
Prof. Jihad R. Touma	CAMS, AMERICAN UNIVERSITY OF BEIRUT, LEBANON	✉ jt00@aub.edu.lb