

ROBERT STEIN

CURRICULUM VITAE

MULTI-MESSENGER ASTRONOMY | TIDAL DISRUPTION EVENTS | MACHINE LEARNING

PERSONAL DATA

PLACE AND DATE OF BIRTH: London | 10 June 1995
CITIZENSHIP: British & Irish
EMAIL: rdstein@umd.edu
WEBSITE: robertdstein.github.io

EDUCATION

JULY 2017 – NOV. 2021 | PhD in EXPERIMENTAL PHYSICS,
Humboldt University of Berlin / DESY Zeuthen
Thesis: “*Search for Multi-Messenger Transients with IceCube and ZTF*”
Research Advisor: A. FRANCKOWIAK
Graded “*Summa cum laude*” (with the highest distinction)

- Cross-correlation of neutrinos with multi-wavelength catalogues
- Led response to neutrino alerts as the *IceCube realtime shifter*
- ZTF follow-up of neutrino/gravitational wave/GRB events

SEP. 2013 – JUNE 2017 | MSci in PHYSICS WITH A YEAR IN EUROPE,
Imperial College London / University of Hamburg
Thesis: “*Reconstruction of Charge Number of Heavy Cosmic Rays using Cherenkov Light*”
Research Advisor: D. HORNS (University of Hamburg)
Graduated with First Class Honours

ACADEMIC CAREER

NOV. 2024 – PRESENT | Neil Gehrels Prize Postdoctoral Fellow
Joint Space-Science Institute (JSI)
Mentor: C. REYNOLDS

- Multi-Messenger follow-up of neutrinos and gravitational waves
- TDE discovery and population science

NOV. 2021 – OCT. 2024 | Postdoctoral Scholar in ASTRONOMY,
California Institute of Technology
Mentor: M. M. KASLIWAL

- ZTF follow-up of neutrino/gravitational wave/GRB events
- WINTER data analysis and multi-messenger follow-up
- Development of TDE photometric classifier: `tdescore`

SELECTED TALKS (INVITED ONLY)

24 TH MAY 2023	INVITED TALK, Caltech Astronomy Colloquium, Pasadena, USA “ <i>Chasing Ghosts: Searching for Electromagnetic Counterparts to High-Energy</i> ”
20 TH MAR 2023	INVITED PLENARY TALK, 86 th DPG Meeting (SMuK), Dresden, DE “ <i>Black Holes, Shredded Stars and Cosmic Neutrinos</i> ”
1 ST NOV. 2022	INVITED TALK, PSU GAPP Seminar, State College, USA “ <i>Search for electromagnetic counterparts to high-energy neutrinos</i> ”
27 TH OCT. 2022	INVITED TALK, Cornell SMBH Workshop, Ithaca, USA “ <i>Neutrinos and TDEs</i> ”
29 TH SEP. 2022	INVITED TALK, 18 th Vulcano Workshop on Frontier Objects in Astrophysics and Particle Physics, Elba, IT “ <i>A tidal disruption event coincident with a high-energy neutrino</i> ”
16 TH SEP. 2022	INVITED TALK, DESY Astroparticle Seminar, Zeuthen, DE “ <i>WINTER: a new IR telescope for time-domain and multi-messenger science</i> ”
14 TH SEP. 2022	INVITED TALK, IR Astronomy in Antarctica Workshop, FR “ <i>High-energy neutrinos and Tidal Disruption Events</i> ”
19 TH AUG. 2022	INVITED TALK, UMD Seminar, College Park, USA “ <i>Neutrino Follow-up with the Zwicky Transient Facility</i> ”
13 TH JULY 2021	INVITED PLENARY HIGHLIGHT TALK, 38 th International Cosmic Ray Conference (ICRC), Berlin, DE “ <i>A tidal disruption event coincident with a high-energy neutrino</i> ”
6 TH JULY 2021	INVITED TALK, AIRUB science seminar, Bochum, DE “ <i>Neutrinos from shredded stars</i> ”
29 TH JUNE 2021	INVITED TALK, European Astronomical Society, Leiden, NL “ <i>Neutrinos from tidal disruption events</i> ”
16 TH JUNE 2021	INVITED TALK, LIGO-GRITTS seminar, Pasadena/Cambridge, USA “ <i>A tidal disruption event coincident with a high-energy neutrino</i> ”
10 TH DEC. 2020	INVITED TALK, Cosmic Rays and Neutrinos in the Multi-Messenger Era, Paris, FR “ <i>Neutrinos from tidal disruption events</i> ”
14 TH OCT. 2020	INVITED TALK, ASTRON Astrolunch, Dwingeloo, NL “ <i>A high-energy neutrino coincident with a tidal disruption event</i> ”
25 TH AUG. 2020	INVITED TALK, NASA GSFC ASD Colloquium, Greenbelt, USA “ <i>A high-energy neutrino coincident with a tidal disruption event</i> ”
5 TH JUNE 2020	INVITED TALK, DESY Astroparticle Seminar, Zeuthen, DE “ <i>A high-energy neutrino coincident with a tidal disruption event</i> ”

26 TH OCT. 2019	INVITED TALK, PAHEN Conference, Berlin, DE “ <i>Neutrinos from optical transients with IceCube</i> ”
30 TH JULY 2018	INVITED TALK, ESO Thirty Minute Talk, Santiago, CL “ <i>ZTF and the AMPEL Broker: Providing a realtime public astronomy survey</i> ”

SCHOLARSHIPS, AWARDS AND HONOURS

11 TH MAY 2023	Winner of the Global Neutrino Network (GNN) Thesis Prize
22 ND MAR 2023	Winner of the DPG (German Physical Society) Dissertation Prize for the Matter and Cosmos division, DPG Annual Meeting, Dresden
26 TH MAR 2021	Winner of the <i>IceCube Impact Award</i> , IceCube Spring 2021 Meeting
2 ND JULY 2020	Winner of first session poster competition, Neutrino 2020 Conference
16 TH OCT 2019	Winner of the annual DESY Science Slam, DESY Hamburg
21 ST NOV 2018	Winner of the annual Zeuthen Science Slam, DESY Zeuthen

SELECTED TELESCOPE TIME AWARDED (PI ONLY)

FEB. 2024 – JAN. 2025	Keck Observatory Program (PI) - 16 hours, 2 semester <i>A search for missing Tidal Disruption Events</i>
OCT. 2023 – NOV. 2023	Chandra Program (PI) - 25 ks, DDT, \$20,630 grant <i>Unveiling the nature of a candidate multi-messenger supernova</i>
AUG. 2023 – AUG. 2024	Palomar P48 + P60 Program (PI) - 63 hours, 2 semesters <i>Uncovering the dustiest transients with ZTF and WINTER</i>
FEB. 2023 – JAN. 2025	Gemini Program (PI) - 12 hours, 4 semesters <i>Spectroscopic Classification of Candidate Neutrino Sources</i>
AUG. 2022 – JUL. 2023	Keck Observatory Program (PI) - 16 hours, 2 semesters <i>Candidate Neutrino Sources</i>
JUNE 2020 – NOV. 2020	Very Large Array Program (PI) - 6 hours, DDT <i>VLA observations to establish the neutrino counterpart to a giant AGN flare</i>

SELECTED PROFESSIONAL RESPONSIBILITIES

2021 – PRESENT	Journal Referee <i>ApJ</i> , <i>MNRAS</i> , <i>PASP</i>
2021 – PRESENT	Proposal Referee and TAC Member <i>JCMT (referee)</i> , <i>Gemini (referee)</i> , <i>Caltech Palomar/Keck (TAC)</i>
AUG. 2023 – PRESENT	LOC / SOC Member <i>ZTF Collaboration Meeting (Caltech)</i> , <i>Caltech-LANL TDA Workshop</i> , <i>Caltech-LANL Summer School</i>
MAY 2022 – PRESENT	ZTF Science Working Group Leadership <i>AGN/TDE Chair (2022-2023)</i> , <i>MMA Co-Convenor (2022-Present)</i> , <i>Publication Board Member (2022-Present)</i>

SUPERVISION, TEACHING AND OUTREACH

JUN. 2023 – JULY 2023	Supervision of high-school students for summer research projects: A. DRAKE, S. SUTANTO, N. LAM
JUN. 2022 – AUGUST 2022	Supervision of summer undergraduate research fellow: L. YANG <i>Hunting for Kilonovae with ZTF and SkyPortal</i>
OCT. 2019 – OCT. 2020	Supervision of master's degree student: J. NECKER <i>Search for high-energy neutrinos from core-collapse supernovae</i>
SEP. 2019 – SEP. 2020	Supervision of master's degree student: R. NAAB <i>The next-generation Optical Follow-Up (OFU) program for IceCube</i>
OCT 2018 – AUG. 2019	Supervision of bachelor's degree student: A. VAGTS <i>Investigation of the TXS 0506+056 neutrino spectrum</i>

JULY 2022 – JULY 2023	Lecturer: <i>Annual ZTF Summer School</i> (2 years)
JUNE 2018 – JULY 2019	Teaching Assistant: <i>Experimental Astroparticle Physics</i> (2 semesters)

FEB. 2024	Presenter: <i>Poster at Caltech Watson Lecture Series</i>
AUG. 2023	Presenter: <i>Astronomy on Tap</i>
OCT. 2018 – NOV. 2019	Volunteer: <i>International Cosmic Day</i> (2 years)
JUNE 2018 – JUNE 2019	Volunteer: <i>Lange Nacht der Wissenschaft</i> (2 years)
MARCH 2018	Organiser: <i>IceCube Masterclass</i>

ADDITIONAL INFORMATION

Collaboration Membership WINTER, ZTF, GROWTH, LSST-TVSSC
Programming Skills: Python, PostgreSQL, L^AT_EX, Bash, git (Advanced)
Language Skills: English (Native Speaker), German (Advanced - C1)
Observing Experience: Keck: LRIS, NIRES, DEIMOS (8 nights)
Palomar: WIRC, DBSP, TSpec (13 nights)
La Silla: NTT (8 nights)

PROFESSIONAL REFERENCES

Professor Anna Franckowiak	RUB	franckowiak@astro.ruhr-uni-bochum.de
Professor Mansi Kasliwal	Caltech	mansi@astro.caltech.edu
Professor Matthew Graham	Caltech	mjg@caltech.edu
Professor Marek Kowalski	DES Y	marek.kowalski@desy.de
Professor Brad Cenko	NASA GSFC	brad.cenko@nasa.gov

SELECTED PUBLICATIONS (*PEER-REVIEWED)

- Full list available at [Google Scholar](#)

- **Stats:** 11656 citations, h-index 45, i-10 index: 114, 107 peer-reviewed publications

- 96 GCNs + 11 ATEs + 4 AstroNotes (non-refereed), 78 preprints + proceedings

2024 *tdescore: An Accurate Photometric Classifier for Tidal Disruption Events*

***R. Stein** ET AL. ApJL, 965, L14

Establishing accretion flares from massive black holes as a major source of high-energy neutrinos

*S. VAN VELZEN, **R. Stein** ET AL., MNRAS, Volume 529, Issue 3

SN2023uqf: Portrait of a candidate multi-messenger supernova

R. Stein ET AL. (in prep.)

2023 *Neutrino Follow-Up with the Zwicky Transient Facility*

***R. Stein** ET AL., MNRAS, Volume 521, Issue 4

Constraining High-energy Neutrino Emission from Supernovae with IceCube

*IceCube Collaboration, ApJL 949 L12

- **R. Stein** as one of three credited authors

2022 *ASAS-SN follow-up of IceCube high-energy neutrino alerts*

*J. NECKER, T. DE JAEGAR, **R. Stein** ET AL., MNRAS, Volume 516, Issue 2

The candidate tidal disruption event AT2019fdr coincident with a high-energy neutrino

*S. REUSCH, **R. Stein** ET AL., Phys. Rev. Lett. 128, 221101

2021 *Tidal Disruption Events and High-Energy Neutrinos*

R. Stein, PoS(ICRC2021)009

A tidal disruption event neutrino coincident with a high-energy neutrino

***R. Stein** et al., 2021, Nat Astron 5, 510-518

2020 *Kilonova Luminosity Function Constraints based on Zwicky Transient Facility searches for 13 Neutron Star Mergers*

*M. M. KASLIWAL, S. ANAND, T. AHUMADA **R. Stein** ET AL., ApJ, 905, 145

2019 *Search for Neutrinos from Populations of Optical Transients*

, **R. Stein** FOR THE ICECUBE COLLABORATION, PoS(ICRC2019)1016

SELECTED SOFTWARE

2023 **R. Stein** ET AL., *Mirar*

Photometric reduction code, used for WINTER, SEDmV2 and DREAMS.

2020 **R. Stein** ET AL., *NuZTF*, DOI: [10.5281/zenodo.4048335](#)

ZTF MMA analysis code, used for neutrino, GW and GRB searches.

R. Stein ET AL., *Flarestack*, DOI: [10.5281/zenodo.3619383](#)

Likelihood analysis code for neutrino correlation studies