

# ROBERT STEIN

## CURRICULUM VITAE

### PERSONAL DATA

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PLACE AND DATE OF BIRTH: London | 10 June 1995  
CITIZENSHIP: British & Irish  
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### EDUCATION

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JULY 2017 – NOV. 2021	PhD in EXPERIMENTAL PHYSICS, <b>Humboldt University of Berlin / DESY Zeuthen</b> Thesis: “ <i>Search for Multi-Messenger Transient with IceCube and ZTF</i> ” Research Advisor: A. FRANCKOWIAK Graded “ <i>Summa cum laude</i> ” (with distinction) <ul style="list-style-type: none"><li>• Cross-correlation of neutrinos with multi-wavelength catalogues</li><li>• Led response to neutrino alerts as the <i>IceCube realtime shifter</i></li><li>• ZTF follow-up of neutrino/gravitational wave/GRB events</li></ul>
SEP. 2013 – JUNE 2017	MSci in PHYSICS WITH A YEAR IN EUROPE, <b>Imperial College London / University of Hamburg</b> Thesis: “ <i>Reconstruction of Charge Number of Heavy Cosmic Rays using Cherenkov Light</i> ” Research Advisor: D. HORNS (University of Hamburg) Graduated with First Class Honours <ul style="list-style-type: none"><li>• Development of novel reconstruction method for heavy cosmic rays detected by IACTs, using direct Cherenkov light</li><li>• Estimates of performance for simulated CTA geometries</li></ul>

### ACADEMIC CAREER

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NOV. 2021 – PRESENT	Postdoctoral Scholar in ASTRONOMY, <b>California Institute of Technology</b> Mentor: M. M. KASLIWAL <ul style="list-style-type: none"><li>• ZTF follow-up of neutrino/gravitational wave/GRB events</li><li>• WINTER data analysis and multi-messenger follow-up</li></ul>
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### SELECTED TALKS

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13 <sup>TH</sup> JULY 2021	INVITED PLENARY HIGHLIGHT TALK, 38 <sup>TH</sup> International Cosmic Ray Conference (ICRC), Berlin, DE “ <i>A tidal disruption event coincident with a high-energy neutrino</i> ”
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6 <sup>TH</sup> JULY 2021	INVITED TALK, AIRUB science seminar, Bochum, DE <i>“Neutrinos from shredded stars”</i>
29 <sup>TH</sup> JUNE 2021	INVITED TALK, European Astronomical Society, Leiden, NL <i>“Neutrinos from tidal disruption events”</i>
16 <sup>TH</sup> JUNE 2021	INVITED TALK, LIGO-GRITTS seminar, Pasadena/Cambridge, USA <i>“A tidal disruption event coincident with a high-energy neutrino”</i>
10 <sup>TH</sup> DEC. 2020	INVITED TALK, Cosmic Rays and Neutrinos in the Multi-Messenger Era, Paris, FR <i>“Neutrinos from tidal disruption events”</i>
14 <sup>TH</sup> OCT. 2020	INVITED TALK, ASTRON Astrolunch, Dwingeloo, NL <i>“A high-energy neutrino coincident with a tidal disruption event”</i>
25 <sup>TH</sup> AUG. 2020	INVITED TALK, NASA GSFC ASD Colloquium, Greenbelt, USA <i>“A high-energy neutrino coincident with a tidal disruption event”</i>
5 <sup>TH</sup> JUNE 2020	INVITED TALK, DESY Astroparticle Seminar, Zeuthen, DE <i>“A high-energy neutrino coincident with a tidal disruption event”</i>
26 <sup>TH</sup> OCT. 2019	INVITED TALK, PAHEN Conference, Berlin, DE <i>“Neutrinos from optical transients with IceCube”</i>
30 <sup>TH</sup> 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

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26 <sup>TH</sup> MAR 2021	Winner of the <i>IceCube Impact Award</i> , IceCube Spring 2021 Collaboration Meeting
2 <sup>ND</sup> JULY 2020	Winner of first session poster competition, Neutrino 2020 Conference
16 <sup>TH</sup> OCT 2019	Winner of the annual DESY Science Slam, DESY Hamburg
21 <sup>ST</sup> Nov 2018	Winner of the annual Zeuthen Science Slam, DESY Zeuthen

## SELECTED TELESCOPE TIME AWARDED

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OCT. 2020 – MAR. 2021	Australia Telescope Compact Array Program (Co-I) <i>Radio emission from stellar tidal disruption flares</i>
SEP. 2020 – FEB. 2021	Gran Telescopio Canarias Program (Co-I) <i>Spectroscopic classification of potential neutrino counterparts identified by ZTF</i>
JUNE 2020 – PRESENT	Very Large Array Program (PI) <i>VLA observations to establish the neutrino counterpart to a giant AGN flare</i>

## SUPERVISION, TEACHING AND OUTREACH

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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>

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JUNE 2018 – JULY 2019	Teaching Assistant: <i>Experimental Astroparticle Physics</i> (2 semesters)
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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

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<b>Collaboration Membership</b>	WINTER, ZTF, GROWTH, LSST-TVSSC
<b>Programming Skills:</b>	Python, L <sup>A</sup> T <sub>E</sub> X, Bash (Advanced)
<b>Language Skills:</b>	English (Native Speaker), German (Advanced - C1)

## SELECTED PUBLICATIONS (\*PEER-REVIEWED)

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- 2021** R. STEIN, *Tidal Disruption Events and High-Energy Neutrinos*, PoS(ICRC2021)009  
*Presenter of invited ICRC plenary talk, author of accompanying proceedings*
- S. VAN VELZEN ET AL., *Establishing accretion flares from massive black holes as a major source of high-energy neutrinos*, (submitted)  
*Development of statistical analysis and interpretation*
- S. REUSCH ET AL., *The candidate tidal disruption event AT2019fdr coincident with a high-energy neutrino*, (submitted)  
*Realtime follow-up and data analysis, statistical analysis, contributed radio data*
- \*R. STEIN et al., *A tidal disruption event neutrino coincident with a high-energy neutrino* 2021, Nat Astron 5, 510-518  
*Developed analysis framework, led follow-up program, modelling, statistical analysis*
- \*S. VAN VELZEN et al., *Seventeen Tidal Disruption Events from the First Half of ZTF Survey Observations: Entering a New Era of Population Studies* 2021, ApJ, 908, 4  
*Technical implementation of filtering and analysis pipeline, code development*
- 2020** \*M. M. KASLIWAL et al., *Kilonova Luminosity Function Constraints based on Zwicky Transient Facility searches for 13 Neutron Star Mergers* 2020, ApJ, 905, 145  
*Developed one of three analysis frameworks, realtime follow-up and data analysis*
- \*V. PALIYA et al., *Multi-Frequency Observations of the Candidate Neutrino Emitting Blazar BZB J0955+3551* 2020, ApJ, 902, 29  
*Statistical analysis of chance coincidence probability, led neutrino data analysis*
- \*A. FRANCKOWIAK et al., *Patterns in the multi-wavelength behaviour of candidate neutrino blazars* 2020, ApJ, 893, 162  
*Contributed to the discussion and interpretation of neutrino correlation*
- 2019** R. STEIN FOR THE ICECUBE COLLABORATION, *Search for Neutrinos from Populations of Optical Transients*, PoS(ICRC2019)1016  
*Developed likelihood analysis code, TDE catalogue compilation, data analysis*

## SELECTED SOFTWARE

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- 2020** R. STEIN ET AL., *NuZTF*, DOI: [10.5281/zenodo.4048335](https://doi.org/10.5281/zenodo.4048335)  
*Python code for ZTF data analysis, built using the AMPEL framework. Primarily used for neutrino, gravitational wave and gamma-ray burst searches.*
- R. STEIN ET AL., *Flarestack*, DOI: [10.5281/zenodo.3619383](https://doi.org/10.5281/zenodo.3619383)  
*Likelihood analysis python code for neutrino data analysis, as well as for neutrino population and cosmology calculations*