# Anna-Christina Eilers — Curriculum Vitae


**Contact Information**

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**Research Interests**

- Galaxy and Quasar Evolution, the Formation of Supermassive Black Holes
- the High-Redshift Universe, Intergalactic Medium, Epoch of Cosmic Reionization
- Cosmology, the Large-Scale Structure of our Universe
- Structure and Dynamics of the Milky Way
- Machine Learning and Data-Driven Models

**Positions**

**Assistant Professor of Physics** since 2023
Massachusetts Institute of Technology, Cambridge, USA

**Pappalardo Fellow** 2019 – 2023
Massachusetts Institute of Technology, Cambridge, USA

**NASA Hubble Fellow** 2019 – 2022
Massachusetts Institute of Technology, Cambridge, USA

**Education**

**PhD in Astrophysics** (summa cum laude) 2015 – 2019
Max-Planck Institute for Astronomy, Heidelberg, Germany
*Thesis*: "Unravelling 13 Billion Years of Cosmic History with Spectroscopic Studies: From the Milky Way to the Epoch of Reionization"
*Advisors:* Prof. Joseph F. Hennawi, Prof. Hans-Walter Rix

**Master of Science in Physics** 2012 – 2015
University of Heidelberg, Germany
*Thesis*: "Simultaneous Estimation of Quasar Continua and the Lyman-Alpha Forest Flux PDF using a Markov Chain Monte Carlo Algorithm"
*Advisors:* Prof. Joseph F. Hennawi, Prof. Khee-Gan Lee

**Bachelor of Science in Physics** (Maximum Distinction) 2008 – 2011
University of Göttingen, Germany
*Thesis*: "Rate-Model of Coherence between Brain Areals during Selective Attention"
*Advisors:* Dr. Demian Battaglia, Prof. Theo Geisel

**Honours & Awards**

**Otto Haxel Prize for Physics**, Universities of Göttingen, Heidelberg, Karlsruhe 2023
**Otto Hahn Medal**, Max Planck Society 2020
**IAU PhD Prize**, International Astronomical Union 2020
**Doctoral Thesis Award**, German Astronomical Society 2020
**KlarText Prize**, Klaus Tschira Foundation, Prize for Science Communication 2020
**Wilhelm and Else Heraeus PhD Prize**, University of Heidelberg 2020
**NASA Hubble Fellowship** 2019–2022
**Pappalardo Fellowship**, Massachusetts Institute of Technology 2019–2023

**PhD Graduation with *summa cum laude***, University of Heidelberg 2019
**PhD Fellowship**, German National Academic Foundation 2016–2018
**Prize of the Arthur Wolfe Symposium** 2018
**Ernst Patzer Award**, Patzer Foundation, Heidelberg 2017
**Max Planck Fellow for the 66th Lindau Nobel Laureate Meeting** 2016
**Scholarship**, German National Academic Foundation 2012–2015
**Bachelor of Science with Distinction**, University of Göttingen 2011

## Publications

90 refereed publications (13 as first author, 12 as second author, including 7 led by advised students) with a total of > 4500 citations and an h-index of 39. A list of publications is available on NASA/ADS.

## Mentoring

**Graduate Students:**

- **Teodora Bulichi** (MIT), co-advisor with Prof. Mark Vogelsberger since 2023
- **Dominika Ďurovčíková** (MIT), primary advisor since 2022
- **Xiaowei Ou** (MIT), co-supervision of a PhD project 2022–2023
  (primary advisor: Prof. Lina Necib)
- **Sindhu Satyavolu** (TIFR Mumbai), co-supervision of a PhD project 2022–2023
  (primary advisor: Prof. Girish Kulkarni)
- **Huanqing Chen** (University of Chicago), co-supervision of a project 2020–2022
  (primary advisor: Prof. Nick Gnedin)

**Undergraduate Students:**

- **Abby Tejera** (Oberlin College), MIT Summer Research Program (MSRP) 2024
- **Sam Christian** (MIT), UROP since 2023
- **Leah Bigwood** (Durham University) 2021–2022
- **Karna Morey** (MIT), UROP 2020–2021
- **Maria Selina Nitschai** (MPIA), supervision of a Masters project 2019–2020

**Postdocs:**

- **Gene Leung** (MIT) since 2024
- **Yuzo Ishikawa** (MIT) since 2024
- **Minghao Yue** (MIT) since 2022

## Academic Services

**Referee** for *Nature*, *Nature Astronomy*, *ApJ*, *MNRAS*, and *JCAP* since 2019
**Steering Committee Member**, School of Science Postdoctoral Fellowship, MIT 2024
**JWST Time Allocation Committee Member**, Cycle 3 2024
**SOC Member**, First Stars VII Conference, Flatiron Institute, New York 2024
**Chair of the SOC for the "First Light" Conference**, MIT 2023
**Journal Club Co-Organizer**, MIT Kavli Institute 2020–2023
**SOC Member**, IAU Symposium 379: "Dynamical Masses of Local Group Galaxies" 2023
**Fraunhofer-Schwarzschild Postdoctoral Fellowship**, Committee Member 2023
**Magellan Time Allocation Committee**, MIT 2020–2021
**SOC Member**, "Black holes and galaxies at the edge of the Universe", Ringberg 2020
**FINESST External Reviewer** 2020
"Future Investigators in NASA Earth and Space Science and Technology"

**Student Representative** 2015–2019
of the International Max Planck Research School (IMPRS), Heidelberg

## Teaching

**Lecturer**, *Introduction to Electricity and Magnetism* (8.02), MIT Spring 2024
**Guest Lecturer**, Astrophysics graduate class on *Galaxies*, University of Colorado Nov 2020
**Guest Lecturer**, Physics undergraduate class on *Exploring Black Holes*, MIT Oct 2020
**Teaching Assistant**, *Introduction to Astronomy*, University of Heidelberg Spring 2016

## Invited Colloquia & Seminars

**ITC Colloquium**, Institute for Theory and Computation, Harvard University Sept 2024
**Astronomy Colloquium**, Max Planck Institute for Astronomy, Heidelberg June 2024
**Astronomy Colloquium**, University of Maryland, Baltimore May 2024
**Astronomy Colloquium**, Columbia University, New York Apr 2024
**Physics Colloquium**, Argonne National Laboratory Mar 2024
**ITC Luncheon**, Harvard University Apr 2023
**Astronomy Colloquium**, University of Texas, Austin Feb 2023
**Astrophysics Colloquium**, MIT Feb 2023
**Astronomy Colloquium**, Ohio State University Dec 2022
**Astronomy Colloquium**, KIPAC, Stanford Oct 2022
**Astronomy Seminar**, Cosmic DAWN Center, Copenhagen May 2022
**Astrophysics Colloquium**, Australian National University, Canberra May 2022
**Astronomy Colloquium**, University of Bonn Apr 2022
**Astronomy Colloquium**, Ludwig Maximilian University, Munich Dec 2021
**Astrophysics Colloquium**, University of Chicago Dec 2021
**Joint ESO/ALMA Colloquium**, European Southern Observatory Dec 2021
**Astronomy Colloquium**, University of Michigan Nov 2021
**BHI Colloquium**, Black Hole Initiative, Harvard University Oct 2021
**NASA Hubble Fellow Symposium** Oct 2021
**PhD Prize Colloquium**, Annual Meeting of the German Astronomical Society Sept 2021
**Astronomy Seminar**, University of Cambridge May 2021
**Astronomy Seminar**, Kavli IPMU Tokyo May 2021
**19th Annual Pappalardo Fellowship Symposium**, MIT Apr 2021
**EURECA Seminar**, University of Arizona Mar 2021
**Astronomy Colloquium**, École Polytechnique Fédéral de Lausanne (EPFL) Mar 2021
**KICP Seminar**, Kavli Institute for Cosmological Physics, Chicago Feb 2021
**Astrophysics Seminar**, University of California San Diego Jan 2021
**Astronomy Colloquium**, Cornell University Oct 2020
**Strong Gravity Seminar**, Perimeter Institute Sept 2020
**NASA Hubble Fellow Symposium** Sept 2020
**Faculty Lunch Talk**, MIT July 2020
**Aspen Center for Physics Summer Colloquium** June 2020
**High Energy Astrophysics Seminar** Feb 2020
Max Planck Institute for Astrophysics, Garching
**Heraeus Foundation Symposium**, Heidelberg Jan 2020
**NASA Hubble Fellow Symposium**, Washington DC Oct 2019
**Königstuhl Colloquium**, Max Planck Institute for Astronomy July 2019
**Brown Bag Lunch Series**, MIT Oct 2018

**High Energy Astrophysics Seminar**, University of Michigan Oct 2018
**ITC Luncheon**, Harvard-Smithsonian Center for Astrophysics Oct 2018
**Astro Lunch**, University of Washington, Seattle May 2018
**Cosmology Seminar**, Berkeley Center for Cosmological Physics, UC Berkeley Feb 2018
**Cosmology Seminar**, KIPAC Stanford Feb 2018
**Patzer Colloquium**, Max Planck Institute for Astronomy, Heidelberg Nov 2017

## Conference Talks

**Cosmic Dawn Revealed by JWST** *(invited talk)*, KITP, Santa Barbara Aug 2024
**First Stars VII Conference**, Flatiron Institute, New York May 2024
**XXXI$^{st}$ General Assembly of the International Astronomical Union** Aug 2022
*(invited talk)*, Division J Meeting, Busan, South Korea
**Reionization and Cosmic Dawn**, UC Berkeley, California Mar 2022
**Quasars at the Reionization Epoch** *(invited talk)*, EAS Symposium June 2021
**Machine Learning in Astronomy: Methods, Applications** June 2021
**& Challenges**, *(invited talk)*, 238th Meeting of the American Astronomical Society
**Frontiers in Science Symposium**, *(invited talk)*, Max Planck Society Feb 2021
**Supermassive Black Holes Conference**, Pucón, Chile Dec 2020
**YAGN 2020: Young Astronomers on Galactic Nuclei** Oct 2020
**Accreting Supermassive Black Holes Through Cosmic Time** Sept 2020
Annual Meeting of the German Astronomical Society
**Summer All Zoom Epoch of Reionization Astronomy Conference** July 2020
**Black holes and galaxies at the edge of the Universe** *(invited review)* Mar 2020
**IGM 2018: Revealing Cosmology and Reionization History** Sept 2018
**with the Intergalactic Medium**, *(invited talk)*, Kavli IPMU, Tokyo, Japan
**Massive Black Holes in Evolving Galaxies: from Quasars to** July 2018
**Quiescence**, Paris, France
**Arthur Wolfe Symposium on the Inter- and Circumgalactic Medium** Mar 2018
**Medium**, California
**The Circle of Life – Connecting the IGM, CGM, and ISM**, Aug 2017
South Africa
**Unveiling the Physics Behind Extreme AGN Variability**, July 2017
St. Thomas, US Virgin Islands
**High Redshift Quasars in the JWST Era**, Carnegie Observatories Feb 2017
**IGM 2016: From Wall to Web**, Berlin, Germany July 2016
**Signals from the Deep Past – Unveiling Early Cosmic Structures**, July 2016
Valletta, Malta
**Illuminating the Dark Ages – Quasars and Galaxies in the** June 2016
**Reionization Epoch**, Heidelberg, Germany

## Approved Telescope Proposals (as PI)

**HST/ACS Cycle 32** (30 orbits) 2024
*MASQUERADE: Mapping A Super-luminous Quasars Extended Radiative Emission*, ID: 17725
**JWST/NIRSpec MSA Cycle 3** (20.9 hours) 2024
*MASQUERADE: Mapping a Super-luminous Quasar's Extended Radiative Emission*, ID: 4713
**VLT/MUSE** (30 hours) 2024
*MASQUERADE: Mapping A Super-luminous Quasar's Extended Radiative Emission*, ID: 113.268B

**Magellan/LLAMAS** (1 night) 2024
*Searching for Lyman–α Nebulae around High-Redshift Quasars*
**JWST/NIRSpec MSA Cycle 2** (20.9 hours) 2023
*Mapping Quasar Light Echoes with Lyman-alpha Forest Tomography during the Epoch of Reionization*, ID: 3117
**Magellan/FIRE, LLAMAS** (4 nights) 2023
*Searching for Lyman–α Nebulae around High-Redshift Quasars*
**JWST/NIRSpec IFU Cycle 2** (19.6 hours) 2023
*BEES: Black hole Extended Emission Search*, ID: 3079
**ALMA Cycle 9** (3.5 hours) 2022
*The environment of quasars in the early universe: synergy between JWST and ALMA*, 2022.1.00347.S
**Magellan/FIRE, IMACS** (2 nights) 2022
*Exploring high-redshift quasars revealed by Gaia DR3*
**HST/ACS Cycle 29** (11 orbits) 2021
*Quasars with small proximity zones: gravitationally lensed or exceptionally young?*, ID: 16756
**ALMA Cycle 8** (7 hours) 2021
*Triggering Mechanisms of Quasars and Black Hole Fueling in the Early Universe*, 2021.1.00349.S
**VLT/MUSE** (23 hours) 2020, 2021
*Searching for Lyman-alpha Nebulae around Young Quasars*, 106.215A, 108.222J
**Magellan/FIRE** (19 nights) 2019–2021
*The Formation and Growth of Supermassive Black Holes in the Early Universe*
**XMM-Newton** (73 ks) 2019
*The Formation and Growth of Supermassive Black Holes in the Early Universe*, 086179
**IRAM/NOEMA** (20 hours) 2019
*The Formation and Growth of Supermassive Black Holes in the Early Universe*, W19DU
**IRAM/NOEMA** (20 hours) 2017, 2018
*Young Quasars in the Early Universe*, W17EQ, W18EF
**IRAM/NOEMA** (15 hours) 2018
*Is the radio-brightest quasar at $z \sim 6$ one of the youngest (<10,000 years)?*, W18EG
**ALMA Cycle 5** (4.6 hours), *Young Quasars in the Early Universe*, 2017.1.00332.S 2017
**VLT/X-Shooter** (2 nights), *Young Quasars in the Early Universe*, 101.B-02720 2017

## Observing Experience

**Magellan/FIRE, IMACS** (21 nights) since 2020
**VLT/X-Shooter** (2 nights) 2018
**Keck/DEIMOS, HIRES, ESI, LRIS** (16 nights) 2014–2018

## Outreach & Science Communication

**Cambridge Science Festival**, Presentation on Black Holes at the MIT Museum 2024
**Faszination Astronomie**, Outreach Talk (youtube link; in German) 2021
**KlarText Prize**, Prize for Science Communication in Physics 2020
**Public Outreach Fellow** 2015–2019
Center for Astronomy Education and Outreach, Heidelberg
**Articles contributed to "Sterne und Weltraum"** 2017–2019