

CONTACT INFORMATION	University of California, Los Angeles Department of Physics and Astronomy BOX 951547, 475 Portola Plaza Los Angeles, CA, USA, 90095-1547	Phone (work): (+1) 310-794-9223 E-mail: <a href="mailto:sibirrer@astro.ucla.edu">sibirrer@astro.ucla.edu</a> Web: <a href="http://www.astro.ucla.edu/~sibirrer/">www.astro.ucla.edu/~sibirrer/</a>
RESEARCH POSITIONS	<p><b>Postdoctoral Researcher</b>                  University of California, Los Angeles (UCLA)                  Advisor: Tommaso Treu</p> <p><b>PhD in Physics</b>                  Swiss Federal Institute of Technology (ETH Zürich)  <i>Thesis title:</i> Probing Dark Matter with Strong Gravitational                  Lensing                  Advisors: Alexandre Réfrégier, Adam Amara</p> <p><b>M. Sc. in Physics,</b>                  Swiss Federal Institute of Technology (ETH Zürich)  <i>Thesis title:</i> A simple model linking dark matter and Galaxy evolu-                  tion                  Advisors: Alexandre Réfrégier, Simon Lilly</p> <p><b>Student exchange program,</b>                  Hong Kong University of Science and Technology (HKUST)</p> <p><b>B. Sc. in Physics</b>                  Swiss Federal Institute of Technology (ETH Zürich)</p>	<p>2017 - present</p> <p>2013 - 2016</p> <p>2011 - 2013</p> <p>Fall 2010</p> <p>2008 - 2011</p>
TEACHING	<p>As a PhD student at ETH Zurich I had the opportunity to contribute to the teaching efforts at the Institute of Astronomy. During my bachelor and masters degree, I got employed by the D-MATH at ETH as a teaching assistant for undergraduate mathematics courses. Throughout my studies and my PhD at ETH, I coached high school students to prepare them for Physics competitions.</p> <p><b>Advanced Physics Lab:</b> Advanced bachelor level lab course  <i>Responsible for the telescope and operation, mentoring student projects, ETH Zürich</i></p> <p><b>Astrophysics I:</b> 3<sup>rd</sup> yr undergraduate course  <i>Teaching assistant, taught weekly exercise class, ETH Zürich</i></p> <p><b>Physics I:</b> 1<sup>st</sup> yr undergraduate course (Physics &amp; Maths students)  <i>Teaching assistant, taught weekly exercise class, ETH Zürich</i></p>	

**Analysis II:** 1<sup>st</sup> yr undergraduate course (Physics & Maths students) Spring 2010, Spring 2011  
*Teaching assistant, taught weekly exercise class, ETH Zürich*

**Swiss Physics Olympiads:** Coaching high school students 2008 - 2016  
*Lectures and exercises to prepare students for the International Physics Olympiad, Switzerland*

STUDENT  
SUPERVISION

Bachelor and master students at ETH are expected to carry out research projects that range from one day per week of the semester (semester thesis) to half a year (master thesis). At UCLA I am involved in the mentoring of PhD students of T. Treu.

**PhD thesis,** Daniel Gilman 2017 - present  
*Project:* Quasar flux ratio statistics as a probe of Dark Matter

**PhD thesis,** Anowar Shajib 2017 - present  
*Project:* Spatially resolved stellar kinematics to improve time-delay cosmography.

**PhD thesis,** Lilan Yang 2018 - present  
*Project:* Source reconstruction in galaxy clusters.

**Undergrad project,** Eden Molina Fall 2018 - present  
*Project:* Modeling doubly lensed quasars from Keck AO images.

**Master thesis,** Felix Kuhn Fall 2016  
*Thesis title:* Strong and weak lensing in the COSMOS field

**Semester thesis,** Felix Kuhn Fall 2016  
*Thesis title:* Lens modelling with Dark Energy Survey data

**Semester thesis,** Florian Lienhard Spring 2016  
*Thesis title:* Dark matter rendering on the Dark Energy Survey

**Semester thesis,** Felix Mayor Spring 2016  
*Thesis title:* Line-of-sight reconstruction in the strong lens RXJ1131-1231

**Master thesis,** Cyril Welschen Fall 2015 - Spring 2016  
*Thesis title:* Lens environment in the COSMOS field

**Semester thesis,** Kevin Fusshoeller Spring 2015  
*Thesis title:* Automatised analysis of strong lensing systems

**Semester thesis,** Janik Andrejkovic Spring 2014  
*Thesis title:* Shapelet decomposition of dark matter substructure

AWARDS AND  
SUPPORT

<b>Kugelpyramide</b> (lifetime award) of the Swiss Scientific Olympiads <i>Every year, the prize gets awarded to a personality who made significant contributions to Youth and Science.</i>	2016
<b>Experimental Innovation Award</b> (teaching award) of the Department of Physics, ETH Zürich <i>Every year the department of physics of ETH Zurich awards the prize for the best innovation in the Advanced Student Lab.</i>	2016
<b>Swiss Study Foundation, PhD program</b> <i>The Swiss Study Foundation promotes prosperous PhD students in acquiring interdisciplinary and non-academic skills in summer schools, workshops and meetings and provides access to funding and a networking platform.</i>	2013 - 2016
<b>Student exchange program</b> <i>Got awarded a place to participate in the exchange program of ETH Zurich and Hong Kong University of Science and Technology (HKUST).</i>	2010
<b>Swiss Study Foundation, student program</b> <i>The Swiss Study Foundation promotes prosperous PhD students in acquiring interdisciplinary and non-academic skills in summer schools, workshops and meetings and provides access to funding and a networking platform.</i>	2009 - 2013
<b>Swiss Physics Olympiad</b> <i>Highschool level individual physics competition.</i> <i>1. place (winner) preliminary round</i> <i>1. place (winner) national round</i> <i>Honorable mention, International Physics Olympiad, Isfahan, Iran</i>	2007

CONFERENCES & [\* invited]  
WORKSHOPS

Key Science Projects with US-extremely large telescopes, Tucson, USA	Nov 2018
<b>*The future of <math>H_0</math>: Crisis or Concordance?</b> , Chicago, USA	Oct 2018
<b>*Shedding Light on the Dark Universe with Extremely Large Telescopes</b> , Trieste, IT	Jul 2018
<b>*Dark Matter workshop</b> , Madrid, ESP	Jun 2018
<b>*MIAPP distance ladder workshop</b> , Garching, GER	Jun 2018
<b>*Lensing substructure modelling challenge</b> , Reykjavik, Iceland	Jun 2018
STRIDES/HOLICOW workshop, UCLA, USA	Mai 2018

Shedding Light on the Dark Universe with Extremely Large Telescopes, UCLA, USA	Apr 2018
Pacific coast gravity meeting, Caltech, USA	Mar 2018
<b>*Dark Matter@SoCal</b> , Caltech, USA	Aug 2017
STRIDES/H0LiCOW workshop, MPA Garching, Germany	Jun 2017
Aosta strong lensing meeting, Cogne, Italy	Jun 2017
Dark Energy Survey Collaboration meeting, SLAC, USA	Mai 2016
STRIDES/H0LiCOW workshop, UCLA, USA	Mai 2016
<b>*Dark Matter@ETH workshop</b> , ETH Zurich, Switzerland	Feb 2016
Dark Energy Survey Collaboration meeting, Madrid, Spain	Oct 2015
Plenary talk, Dark Energy Survey Collaboration meeting, Ann Arbor, USA	Mai 2015
STRIDES/H0LiCOW workshop, EPFL, Switzerland	Apr 2015
Swiss Cosmology Days, Geneva, Switzerland	Feb 2015
STRIDES workshop, Cambridge, UK	Oct 2014
Santa Cruz Galaxy Evolution workshop, USA	Aug 2014
EWASS, Geneva, Switzerland	Jun 2014
Swiss Cosmology Day, Bern, Switzerland	Feb 2013

SEMINARS & DEPARTEMENTAL TALKS [\* invited]

<b>*Statistics Colloquium</b> , University of Notre Dame, USA	Sep 2018
Cosmology Seminar, MPA, Garching, Germany	Jun 2018
Lunch seminar, UC Santa Barbara, USA	Jun 2018
<b>*Colloquium</b> , UC Davis, USA	Apr 2018
Galaxy lunch seminar, Yale, New Heaven, USA	Jan 2018
IPAC lunch seminar, Caltech, USA	Oct 2017

	<b>*Colloquium</b> , UC Irvine, USA	Oct 2017
	Research seminar, UCLA, USA	Feb 2017
	<b>*AMP colloquium</b> , ETH Zurich, Switzerland	Nov 2016
	Research seminar, IfA ETH Zurich, Switzerland	Oct 2016
	Seminar, Tata Institute for Fundamental Research, Mumbai, India	Jul 2015
	Research seminar, IfA ETH Zurich, Switzerland	Mar 2015
	Research seminar, IfA ETH Zurich, Switzerland	Sep 2013
OBSERVER EXPERIENCE	<b>Keck1 with OSIRIS</b> , 3 half nights <i>IFU observations of absorption line spectroscopy for resolved stellar kinematics, remote observing</i>	Jun 2017
	<b>Blanco telescope (CTIO) with DECam</b> , 8 nights <i>Observer for the Dark Energy Survey</i>	Nov 2014
	<b>50 cm corrected Dall-Kirkham design</b> , $\sim 30$ nights <i>Instructor of the advanced lab course at ETH Zürich</i>	2013 - 2016
RESEARCH PROPOSALS	<b>Co-I</b> , <i>H0, the stellar initial mass function, and other dark matters from a large sample of quadruply imaged quasars</i> , HST, PI: T. Treu	Aug 2018
	<b>Co-I</b> , <i>Testing CDM with the WFC3 Grism</i> , HST, PI: A. Nierenberg	Apr 2017
	<b>Co-I</b> , <i>Probing the dark universe with quadruply imaged quasars</i> , HST, PI: T. Treu	Apr 2017
	<b>Co-I</b> , <i>The first quadruply lensed quasars from the DES and VST ATLAS surveys</i> , HST, PI: P. Schechter	Apr 2016
	<b>Co-I</b> , <i>A unique probe of the dark matter distribution in a halo at <math>z=1</math>: A strong lens with a bright central image</i> , HST, PI: T. Collett	Apr 2016
COMMUNITY CONTRIBUTIONS	Referee for <i>Astronomy&amp;Astrophysics</i> , <i>Astronomy&amp;Computing</i>	2017 - present
	Shedding Light on the Dark Universe with Extremely Large Telescopes, conference, UCLA, <i>LOC member</i>	Apr 2018
	Tuesday Lunch Talk, seminar series, UCLA, <i>coordinator</i>	2018 - present
	Astronomy diversity committee, UCLA, <i>member</i>	2018 - present
	H0LiCOW collaboration, <i>Member, lead author of a key publication</i>	2017 - present

	The Dark Energy Survey (DES), <i>Member, data access rights</i>	2013 - present
	Executive Chairman, International Physics Olympiad 2016, Zurich <i>Steering committee lead, supervision of the academic and administrative project management. Budget of CHF 3 Mio.</i>	2014 - 2016
	Member, Municipality planing panel, Buchrain, Switzerland <i>Strategic planing and advisory board of the municipality</i>	2012 - 2016
	Swiss Physics Olympiad, <i>national coordinator</i> <i>Responsible for the national selection process and training for the International Physics Olympiad</i>	2010 - 2015
PUBLIC OUTREACH	Planetarium show, Astronomy live! program, UCLA,	2018
	Invited talk, Ventura Astronomical society	Jan 2018
	Invited talk, Astronomical Society Aarau	Apr 2016
	Invited talk, Urania Sternwarte Zürich	Mar 2016
	Invited talk, Treffpunkt Science City, ETH Zürich	Mar 2015
	Guide for public tours to the telescope at ETH Zürich	2014 - 2016
TECHNICAL SKILLS	software development, cluster computing, Python (advanced), C++ (basic), $\text{\LaTeX}$	

- OVERVIEW Publications: 13 (7 first-author) refereed, 2 (1 first-author) submitted  
Bibliometrics (first-author only): 100+ total citations, *h*-index of 6
- SUBMITTED JOURNAL PUBLICATIONS
2. **S. Birrer**, T. Treu, C. E. Rusu, V. Bonvin, C. D. Fassnacht, J. H. H. Chan, A. Agnello, A. J. Shajib, G. C. -F. Chen, M. Auger, F. Courbin, S. Hilbert, D. Sluse, S. H. Suyu, K. C. Wong, P. Marshall, B. C. Lemaux and G. Meylan, *H0LiCOW - IX. Cosmographic analysis of the doubly imaged quasar SDSS 1206+4332 and a new measurement of the Hubble constant*, ArXiv e-prints (2018), arXiv:1809.01274, submitted to MNRAS
  1. A. J. Shajib, **S. Birrer**, . . . et al., *Is every strong lens model unhappy in its own way? Uniform modelling of a sample of 12 quadruply+ imaged quasars*, ArXiv e-prints (2018), arXiv:1807.09278, submitted to MNRAS
- REFEREED JOURNAL PUBLICATIONS
- First authored*
7. **S. Birrer** and A. Amara, *Lenstronomy: multi-purpose gravitational lens modelling software package*, Physics of the Dark Universe (2018), arXiv:1803.09746
  6. **S. Birrer**, A. Refregier and A. Amara, *Cosmic Shear with Einstein Rings*, The Astrophysical Journal Letters, 852, L14 (2018), arXiv:1710.01303
  5. **S. Birrer**, A. Amara and A. Refregier, *Lensing substructure quantification in RXJ1131-1231: a 2 keV lower bound on dark matter thermal relic mass*, Journal of Cosmology and Astro-Particle Physics, 05 037, (2017), arXiv:1702.00009
  4. **S. Birrer**, C. Welschen, A. Amara and A. Refregier, *Line-of-sight effects in strong lensing: putting theory into practice*, Journal of Cosmology and Astro-Particle Physics, 04 049, (2017), arXiv:1610.01599
  3. **S. Birrer**, A. Amara and A. Refregier, *The mass-sheet degeneracy and time-delay cosmography: analysis of the strong lens RXJ1131-1231*, Journal of Cosmology and Astro-Particle Physics, 08 020, (2016), arXiv:1511.03662
  2. **S. Birrer**, A. Amara and A. Refregier, *Gravitational Lens Modeling with Basis Sets*, The Astrophysical Journal, 813, 102 (2015), arXiv:1504.07629
  1. **S. Birrer**, S. Lilly, A. Amara, A. Paranjape and A. Refregier, *A Simple Model Linking Galaxy and Dark Matter Evolution*, The Astrophysical Journal, 793, 12 (2014), arXiv:1401.3162

*Significant contributions as co-supervisor*

1. D. Gilman, **S. Birrer**, T. Treu, C. R. Keeton and A. Nierenberg, *Probing the nature of dark matter by forward modeling flux ratios in strong gravitational lenses*, MNRAS 2153 (2018), arXiv:1712.04945

*Collaboration contributions*

5. R. Joseph, F. Courbin, J. -L. Starck, **S. Birrer** *Sparse Lens Inversion Technique (SLIT): lens and source separability from linear inversion of the source reconstruction problem*, A&A accepted (2018), arXiv:1809.09121
4. T. Treu, A. Agnello, M. A. Baumer, **S. Birrer** . . . et al., *The STRong lensing Insights into the Dark Energy Survey (STRIDES) 2016 follow-up campaign. I. Overview and classification of candidates selected by two techniques.*, MNRAS 2202 (2018), arXiv:1808.04838
3. A. Agnello, . . . **S. Birrer** . . . et al., *Models of the strongly lensed quasar DES J0408-5354*, MNRAS 472 (2017), arXiv:1702.00406
2. T. E. Collett, . . . **S. Birrer** . . . et al., *Core or Cusps: The Central Dark Matter Profile of a Strong Lensing Cluster with a Bright Central Image at Redshift 1*, The Astrophysical Journal 843, 148 (2017), arXiv:1703.08410
1. B. Nord, . . . **S. Birrer** . . . et al., *Observation and Confirmation of Six Strong-lensing Systems in the Dark Energy Survey Science Verification Data*, ApJ 827, 51 (2016), arXiv:1512.03062

PROCEEDINGS

1. T. Diel, . . . **S. Birrer** . . . et al., *The dark energy survey and operations: years 1 to 3*, Proceedings of the SPIE, Volume 9910 (2016)

OTHER  
PUBLICATIONS

1. N. Caplar, S. Tacchella and **S. Birrer**, *Quantitative evaluation of gender bias in astronomical publications from citation counts*, Nature Astronomy 1, 0141 (2017), arXiv:1610.08984