

Chloe Elizabeth Fisher

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INTERESTS

I am working on developing atmospheric retrieval methods involving machine learning techniques for extrasolar planets. I use both high- and low-resolution data, and also study the theory of transmission spectra. I aim to use machine learning to analyse multiple datasets simultaneously and consider three-dimensional effects.

Key words: *Exoplanet atmospheres, machine learning, Bayesian inference*

EDUCATION

University of Bern, Switzerland	08/2017 - present
PhD candidate in Astrophysics	
University of Cambridge, UK	10/2012 - 06/2016
MSci., Natural Sciences, first class honours	
BA., Mathematics, upper second class honours	

PUBLICATIONS

- Grimm, S.L., Malik, M., Kitzmann, D., Guzmán Mesa, A., Hoeijmakers, H.J., **Fisher, C.**, Mendonça, J.M., Yurchenko, S.N., Tennyson, J., Alesina, F., Buchschacher, N., Burnier, J., Segransan, D., Kurucz, R.L., & Heng, K. 2021, ApJS, 253, 30
HELIOS-K 2.0 Opacity Calculator and Open-source Opacity Database for Exoplanetary Atmospheres
- Guzmán Mesa, A., Kitzmann, D., **Fisher, C.**, Burgasser, A.J., Hoeijmakers, H.J., Márquez-Neila, P., Grimm, S.L., Mandell, A.M., Sznitman, R., & Heng, K. 2020, AJ, 160, 15
Information Content of JWST NIRSpec Transmission Spectra of Warm Neptunes
- Fisher, C.**, Hoeijmakers, H.J., Kitzmann, D., Márquez-Neila, P., Grimm, S.L., Sznitman, R., & Heng, K. 2020, AJ, 159, 192
Interpreting High-resolution Spectroscopy of Exoplanets using Cross-correlations and Supervised Machine Learning
- Oreshenko, M., Kitzmann, D., Márquez-Neila, P., Malik, M., Bowler, B.P., Burgasser, A.J., Sznitman, R., **Fisher, C.**, & Heng, K. 2020, AJ, 159, 6
Supervised Machine Learning for Intercomparison of Model Grids of Brown Dwarfs: Application to GJ 570D and the Epsilon Indi B Binary System
- Fisher, C.**, & Heng, K. 2019, ApJ, 881, 25
How Much Information Does the Sodium Doublet Encode? Retrieval Analysis of Non-LTE Sodium Lines at Low and High Spectral Resolutions
- Hoeijmakers, H.J., Ehrenreich, D., Kitzman, D., Allart, R., Grimm, S.L., Seidel, J.V., Wyttenbach, A., Pino, L., Nielsen, L.D., **Fisher, C.**, Rimmer, P.B., Bourrier, V., Cegla, H.M., Lavie, B., Lovis, C., Patzer, A.B.C., Stock, J.W., Pepe, F.A., & Heng, K. 2019, A&A, 627, A165
A spectral survey of an ultra-hot Jupiter: Detection of metals in the transmission spectrum of KELT-9b
- Seidel, J.V., Ehrenreich, D., Wyttenbach, A., Allart, R., Lendl, M., Pino, L., Bourrier, V., Cegla, H.M., Lovis, C., Barrado, D., Bayliss, D., Astudillo-Defru, N., Deline, A., **Fisher, C.**, Heng, K., Joseph, R., Lavie, B., Melo, C., Pepe, F., Ségransan, D., & Udry, S. 2019, A&A, 623, A166
Hot Exoplanet Atmospheres Resolved with Transit Spectroscopy (HEARTS) - II. A broadened sodium feature on the ultra-hot giant WASP-76b
- Fisher, C.**, & Heng, K. 2018, MNRAS, 481, 4698
Retrieval analysis of 38 WFC3 transmission spectra and resolution of the normalization degeneracy
- Márquez-Neila, P., **Fisher, C.**, Sznitman, R., & Heng, K. 2018, Nature Astronomy, 2, 719
Supervised machine learning for analysing spectra of exoplanetary atmospheres

REFEREEING

Referee for ApJ Letters	02/2020-Present
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FELLOWSHIPS & AWARDS

SNSF Postdoc.Mobility Fellowship	2022-2024
SSAA MERAC Funding and Travel Award (4500 CHF)	2021
University of Bern International 2021 PhD Fellowship	2017-2020
Bundy Scholarship, University of Cambridge	2016
Magdalene College Natural Sciences award, University of Cambridge	2016

PROFESSIONAL TALKS

• ESO Atmo Conference (Virtual) <i>Lecture: Atmospheric Retrieval using Machine Learning and CCFs</i>	08/2021
• KPIC Mini workshop (Virtual) <i>High-Resolution Retrieval using Machine Learning</i>	06/2021
• Young Physicists Forum, Switzerland (Virtual) <i>Studying Exoplanet Atmospheres from Earth and Space (with Machine Learning)</i>	(Invited) 04/2021
• California Institute of Technology, California, USA (Virtual) <i>“Exoplanet Atmospheric Retrieval using Machine Learning”</i>	(Invited) 09/2020
• University of Chicago Journal Club, Chicago, USA (Virtual) <i>“Exoplanet Atmospheric Retrieval using Traditional Methods and Machine Learning”</i>	(Invited) 08/2020
• ESP Summer School, Bern, Switzerland (Virtual) <i>“HELA”</i>	06/2020
• CSH Symposium, Bern, Switzerland <i>“High-Resolution Atmospheric Retrieval for Exoplanets”</i>	02/2020
• AMLD, Lausanne, Switzerland <i>“Supervised Machine Learning for Exoplanet Atmospheric Retrieval”</i>	(Invited) 01/2020
• DPS, EPSC, Geneva, Switzerland <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	09/2019
• Junior Researchers Assembly, Vitznau, Switzerland <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	09/2019
• ESP Summer School, Lenzerheide, Switzerland <i>“HELA”</i>	06/2019
• CSH Symposium, Bern, Switzerland <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	01/2019
• Machine Learning Series, Oxford, UK <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	(Invited) 11/2018
• SPI-MAX, Oxford, UK <i>“Retrieval Analysis of WFC3 Transmission Spectra of Exoplanets”</i>	(Invited) 11/2018
• Bern Exoplanet Retreat, Monte Verita, Switzerland <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	09/2018
• Spectroscopy of Exoplanets, Windsor, UK <i>“Supervised Machine Learning for Analysing Spectra of Exoplanetary Atmospheres”</i>	07/2018
• DTU Workshop, Copenhagen, Denmark <i>“Retrieval Analysis of WFC3 Transmission Spectra”</i>	05/2018

TEACHING & ORGANISATION	Mentor for visiting refugee high-school student University of Bern, Switzerland	09/2018 - present
	SOC for ESO Atmo 2021 Conference	08/2021
	TA for Bachelor's Physics Exercises and Lab Courses University of Bern, Switzerland	2020-2021
	TA for Master's Course " <i>Advanced Statistical Methods for Physicists</i> " University of Bern, Switzerland	02-06/2019
	Physics A-level teaching assistant The Cherwell School, UK	05-07/2017
	Student mentor for Cambridge STEP school University of Cambridge, UK	04-06/2013; 08/2014
OUTREACH	Talk at A-Level certificates evening The Cherwell School, UK	12/2019
	Video for International Relations University of Bern, Switzerland	11/2019
	Talk at Pint of Science Bern, Switzerland	05/2019