

Experience

2018 Nov –
Present

Postdoctoral Fellow | JPL, Pasadena & LMU, Munich

Project: 3D Tomographic Cloud Reconstruction using multi-angle Imaging Observations.

- Developing deep learning methods to improve prior of reconstruction algorithm
- Created deep learning training dataset of synthetic observations using 3D radiative transfer modeling
- Introduced new concepts to optimize performance of forward solver, see [publication]
- Refactoring reconstruction algorithm within a multi-national and inter-disciplinary team on GitHub
- Collaboration with JPL's Autonomous Systems Division for developing "Multi-Agent Motion Planning using Deep Learning for Space Applications", see [publication]

2018 Jun –
2018 Aug

Data Scientist | mVISE, Munich

Project: Time Series Analysis and Forecasting for major German automobile manufacturer

- Created training material within an agile team of five Data Scientists
- Created Python examples for stochastic models (AR/MA/ARIMA) and machine learning (RNN, LSTM)

2018 Jan –
2018 Mar

Postdoctoral Research Assistant | LMU, Munich

- Set up a shared GitHub repository for the group including documentation
- Successful application for LMU Munich / EU MSCA COFUND Research Fellowship
- Working towards further publications on HaloCam's calibration and retrieval of ice crystal properties

2013 Mar –
2017 Dec

Graduate Student | LMU, Munich

Project: Information Content of Halo Displays for Remote Sensing of Ice Crystal Properties

- Design and implementation of HaloCam, an automated weather-proof sun-tracking camera system leading to first consistent halo dataset spanning > 7 years
- Camera calibration (geometric and radiometric), see [publication]
- Automated image classification using image processing and machine learning methods (Random Forest Classifier), see [publication]
- Developed a 3D Monte Carlo based raytracing algorithm augmenting MYSTIC radiative transfer model
- Organized and carried out LMU contribution to international field campaigns (ML-CIRRUS, ACCEPT), incl. software development for operation of airborne and ground-based imagers
- Teaching Assistant for the lecture "Clouds: Microphysics and Convection"

2012 Aug –
2012 Sep

Visiting Scientist | NASA GISS, New York City

Project: Retrieval of cloud droplet size distribution in water clouds using polarimetric multi-wavelength observations of the RSP (Research Scanning Polarimeter) instrument. Advisor: Dr. Brian Cairns.

2011 Apr –
2010 Oct

Assistant Meteorologist | Meteo Systems, Abu Dhabi

- Preparation and presentation of daily meteorological forecast
- Now-casting and monitoring of (heavy) rain events using radar observations

2012 Jan –
2012 Mar

Working student | LMU, Munich

Project: Created look-up tables for atmospheric correction of ESA's Sentinel-2 satellite imagery using 3D radiative transfer simulation.

Linda Forster, Ph.D.

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Education

2013 Mar –
2017 Dec

Dr.rer.nat, Meteorology | LMU, Munich

Dissertation: “Information Content of Halo Displays for Remote Sensing of Ice Crystal Properties”.
Advisors: Prof. Dr. Bernhard Mayer (LMU) and Prof. Dr. Markus Rapp (DLR, Oberpfaffenhofen).

2009 Oct –
2012 Aug

Master of Science, Meteorology | LMU, Munich

Thesis: “Retrieval of Water Cloud Optical Properties using Ground-Based Polarimetric Measurements”.
Advisors: Prof. Dr. Bernhard Mayer, Dr. Claudia Emde. Contributed to extending the SSARA sun-photometer for polarimetric measurements incl. calibration, see [publication].

2006 Oct –
2009 Aug

Bachelor of Science, Physics | LMU, Munich

Thesis: “Effects of Three-Dimensional Photon Transport on the Radiative Forcing of Contrails”, at DLR, Oberpfaffenhofen. Advisor: Dr. Claudia Emde. See [publication].

Funding & Awards

2018 Nov –
Present

LMU Munich / EU MSCA COFUND Research Fellowship

Funded by European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 754388.

2015 Jan

Amelia Earhart International Fellowship

Awarded yearly to 35 women world-wide, who pursue a Ph.D. in aerospace or related fields.

2014 Sep –
2014 Nov

ACTRIS TransNational Access – ICYHALO

Observation of ice particle shape and orientation from ground-based remote sensing measurements.

Invited Talks

2019 Nov

NASA Goddard Space Flight Center – Cloud-Precipitation Center Seminar

Greenbelt, MD, US

“From remote sensing of ice crystal properties to 3D tomographic cloud reconstruction”

2019 Jul

Gordon Research Seminar – Radiation & Climate

Lewiston, ME, US

“Remote Sensing of Ice Crystal Properties using Observations of Halo Displays”

2014 Feb

Leipzig Graduate School, Aerosols and Radiation

TROPOS, Leipzig, GER

“Monte-Carlo polarized radiative transfer modeling” (on behalf of Dr. Claudia Emde)

Peer Review

Journal of the Atmospheric Sciences (JAS)
Atmospheric Measurement Techniques (AMT)
NASA FINESST Graduate Student Proposal Review

Tools & Methods

Python (opencv, xarray, pandas, scikit-learn, pytorch), C, Fortran90, Linux, Shell Scripting, AWK, Git/GitLab, L^AT_EX, remote sensing, 3D radiative transfer modeling, ray tracing, camera calibration, computer vision, image processing, machine learning, deep learning, unit testing, test-driven development, multi processing, distributed computing, visualization (matplotlib, VisIt).

Peer-reviewed Publications

1. Davis, A. B., **L. Forster**, D. J. Diner, and B. Mayer (submitted): Toward cloud tomography from space using MISR and MODIS: The physics of image formation for opaque convective clouds, *J. Atmos. Sci.* Preprint available at <https://arxiv.org/abs/2011.14537>.
2. Stevens, B. et al., (in press): EUREC4A, *Earth Syst. Sci. Data.* Preprint available at <https://doi.org/10.5194/essd-2021-18>.
3. **Forster, L.**, A. B. Davis, D. J. Diner, and B. Mayer, 2021: Toward Cloud Tomography from Space Using MISR and MODIS: Locating the “Veiled Core” in Opaque Convective Clouds. *J. Atmos. Sci.*, 78, 1, 155-166, doi: 10.1175/JAS-D-19-0262.1.
4. Yun, K. C. Choi, R. Alimo, A. B. Davis, **L. Forster**, A. Rahmani, M. Adil, and R. Madani, 2020: Multi-Agent Motion Planning using Deep Learning for Space Applications, AIAA ASCEND Nov 16-18, doi: 10.2514/6.2020-4233.
5. **Forster, L.**, M. Seefeldner, A. Baumgartner, T. Koelling, and B. Mayer, 2020: Ice Crystal Characterization in Cirrus Clouds II: Radiometric Characterization of HaloCam for the Quantitative Analysis of Halo Displays. *Atmos. Meas. Tech.*, 13, 3977–3991, doi: 10.5194/amt-13-3977-2020.
6. Grob, H., C. Emde, M. Wiegner, M. Seefeldner, **L. Forster**, and B. Mayer, 2020: The polarized Sun and sky radiometer SSARA: design, calibration, and application for ground-based aerosol remote sensing, *Atmos. Meas. Tech.*, 13, 239–258, doi: 10.5194/amt-13-239-2020.
7. **Forster, L.**, M. Seefeldner, M. Wiegner, and B. Mayer, 2017: Ice Crystal Characterization in Cirrus Clouds: a Sun-Tracking Camera System and Automated Detection Algorithm for Halo Displays. *Atmos. Meas. Tech.*, 10 (7), 2499–2516, doi: 10.5194/amt-10-2499-2017.
8. Voigt, C. et al., 2016: ML-CIRRUS - The airborne experiment on natural cirrus and contrail cirrus with the high-altitude long-range research aircraft HALO. *Bull. Amer. Meteor. Soc.*, 98, 271–288, doi: 10.1175/BAMS-D-15-00213.1.
9. **Forster, L.**, C. Emde, S. Unterstrasser, and B. Mayer, 2012: Effects of Three-Dimensional Photon Transport on the Radiative Forcing of Realistic Contrails. *J. Atmos. Sci.*, 69 (7), 2243–2255, doi: 10.1175/JAS-D-11-0206.1.

Conference Contributions (first author)

1. **Forster, L.**, T. Kölling, V. Pörtge, T. Zinner, B. Mayer, A. Levis, J. Loveridge, A. B. Davis: 3D Cloud Tomography during EUREC⁴A. AGU Fall Meeting, December 1 - 17, 2020, virtual.
2. **Forster, L.**, A. B. Davis, D. J. Diner, and B. Mayer: 3D Cloud Tomography using Satellite Observations: Defining the “Veiled” Core. AGU Fall Meeting, December 9 - 13, 2019, San Francisco, CA.
3. **Forster, L.**, A. B. Davis, D. J. Diner, B. Mayer, M. Kurowski, and J. Teixeira: Synthetic MODIS and MISR Images of Planetary Boundary Layer Cloud Scenes: Application to 3D Cloud Tomography Development. MODIS Science Team Meeting, November 18 - 22, 2019, College Park, MD.
4. **Forster, L.** and B. Mayer: Remote Sensing of Ice Crystal Properties Using Observations of Halo Displays. Gordon Research Seminar, Radiation and Climate, July 20 - 21, 2019, Lewiston, ME.
5. **Forster, L.**, A. B. Davis, D. J. Diner, and B. Mayer: 3D cloud tomography using satellite observations: defining the “veiled” core. Gordon Research Conference, Radiation and Climate, July 21 - 26, 2019, Lewiston, ME.
6. **Forster, L.**, A. B. Davis, D. J. Diner, and B. Mayer: 3D cloud tomography using MISR data: defining the “veiled” core. JPL Postdoc Research Day, July 10, 2019, Pasadena, CA.
7. **Forster, L.**, A. B. Davis, and B. Mayer: MISR’s perspective on the “hidden zone” inside opaque convective clouds. MISR Science Team Meeting, February 13, 2019, Pasadena, CA.
8. **Forster, L.**, F. Ewald, T. Koelling, and B. Mayer: Observation of Ice Particle Shape and Orientation from Ground-based Remote Sensing Measurements. Gordon Research Conference, July 26 - 31, 2015, Lewiston, ME.
9. **Forster, L.**, F. Ewald, T. Koelling, and B. Mayer: Observation of ice particle habits and orientation from ground-based remote sensing measurements. AMS 14th Conference on Cloud Physics, 7-11 July 2014, Westin Copley Place, Boston, MA.