Dr. Samuel LeBlanc

www.samueleleblanc.com
Research Scientist, Bay Area Environmental Research Institute
NASA Ames Research Center, Building 245, room 102, Moffett Field, CA
Phone: (720) 276-4457, email: samuel.elie.leblanc@gmail.com, samuel.leblanc@nasa.gov

Education

Ph.D. Atmospheric and Oceanic Sciences – *University of Colorado*, *Boulder, Colorado* 2011-2014
M.Sc. Atmospheric and Oceanic Sciences – *University of Colorado*, *Boulder, Colorado* 2008-2011
B.Sc. Specialization in Physics – *University of Ottawa*, *Ottawa, Ontario, Canada* 2003-2008

Professional and Research Experience

Research Scientist – *Bay Area Environmental Research at NASA Ames Research Center* Since 2016
Sunphotometer-Satellite team within the Earth Science Division
- PI (deputy-PI in 2016/2017) for 4STAR instrument during ORACLES and part of flight planning team.
- Successfully lead team of 20 experimenters and scientist for cross Atlantic transit and research flights while managing evolving weather, aircraft conditions, and science objectives.
- Science PI for technology development muSSTAR, miniaturization of 4STAR.
- Quantify global direct aerosol radiative effect from combined MODIS-OMI-CALIPSO.

NASA Postdoctoral Fellow – *ORAU/NASA Ames Research Center* 2014-2016
Advisor: Dr. Jens Redemann, Sunphotometer-Satellite team within the Earth Science Division
- Apply remote sensing retrieval of cloud properties from spectral zenith radiance measurements.
- Support the deployment of 4STAR during field missions, and the continual improvement of the instrument's software, hardware, and calibration efforts.

Research Assistant – *LASP/University of Colorado* 2009-2014
Advisor: Dr. Peter Pilewskie, Atmospheric Radiation Group within the ATOC Department
- Support the deployment during field campaigns and development of the Solar Spectral Flux Radiometer (SSFR), including quality control and analysis of collected data.

Teaching Experience

Mentorship of interns – *NASA Ames Research Center* Since 2019
Education research for improving undergraduate atmospheric laboratory – *Uni. of Colorado* 2009-2013
Science camp instructor for under-represented youth – *Actua, throughout Canada* 2004-2011
Undergraduate meteorology lab instructor – *University of Colorado* 2008-2009

Skills and Synergistic Activities

Support of instrument deployments (SSFR and 4STAR) during multiple field campaigns Since 2010
Took part in CalNex(2010), ATTREX(2011-2013), DC3(2012), PODEX(2013), SEAC4RS(2013), ARISE(2014), NAAMES(2015-2020), KORUS-AQ(2016), ORACLES(2015-2020), Canada's Oil Sands Region experiment (2018) as instrument scientist.

Multi-Scale data analysis of aerosol and cloud properties (satellite, airborne, ground obs.) Since 2012

Instrument design and capability development Since 2009
Development of the Skywatch Observatory (http://skywatch.colorado.edu).
Science analysis and design review of next iteration of 4STAR instrument (4STARB, 5STAR, muSSTAR).
Software development for active stabilization of radiometric instruments onboard aircraft.
Helped increase the Technical Readiness Level (TRL 7 to 9) of Solar Spectral Flux Radiometers (SSFR).

Radiative transfer modelling of spectrally resolved solar radiation Since 2012
Employed high end computing clusters (NASA's Pleaides computing cluster) for radiative transfer modelling of the solar and thermal spectrum.

Remote sensing algorithm development using optimal estimation and Bayesian techniques. Since 2012
Retrieval of cloud properties (cloud optical depth, effective radius, and thermodynamic phase) from solar shortwave measurements from below cloud.

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Selected publications and presentations

Combined 101 published works, 3 first-author peer-reviewed journal articles, 2 published software packages, 3 publications in prep., and 37 first-authored conference presentations, with 7 invited talks:

LeBlanc, S. E., et al: Above Cloud Aerosol Optical Depth from airborne observations in the South-East Atlantic, Atmos. Chem. Phys., 1–40, doi:10.5194/acp-2019-43, 2020.

Gupta, S., **et al**.: Impact of the Variability in Vertical Separation between Biomass-Burning Aerosols and Marine Stratocumulus on Cloud Microphysical Properties over the Southeast Atlantic, Atmos. Chem. Phys., doi:10.5194/acp-2020-1039, 2021.

LeBlanc, S. E.: samuelleblanc/fp: Moving Lines: NASA airborne research flight planning tool release (Version v1.21). Zenodo. doi:10.5281/zenodo.1478126, 2018.

Segal Rozenhaimer, **et al.**: Bias and sensitivity of boundary layer clouds and surface radiative fluxes in MERRA-2 and airborne observations over the Beaufort Sea during the ARISE campaign. Journal of Geophysical Research: Atmospheres, 123, 6565–6580. DOI:10.1029/2018JD028349, 2018.

Kacenelenbogen, **et al.**: Estimations of Global Shortwave Direct Aerosol Radiative Effects Above Opaque Water Clouds Using a Combination of A-Train Satellite Sensors, Atmos. Chem. Phys., 19(7), 4933–4962, doi:10.5194/acp-19-4933-2019, 2019.

LeBlanc, S. E., et al.: Impact of biomass burning aerosol layers on the underlying cloud radiative effects in the South East Atlantic, the 2017 joint IAPSO-IAMAS-IAGA conference, Cape Town, South Africa, August-September 2017

LeBlanc, S. E., Pilewskie, P., Schmidt, K. S., and Coddington, O.: A spectral method for discriminating thermodynamic phase and retrieving cloud optical thickness and effective radius using transmitted solar radiance spectra, *Atmos. Meas. Tech.*, 8, 1361-1383, doi:10.5194/amt-8-1361-2015, 2015.

LeBlanc, S. E., K. S. Schmidt, P. Pilewskie, J. Redemann, C. Hostetler, R. Ferrare, J. Hair, J. M. Langridge, and D. A. Lack: Spectral aerosol direct radiative forcing from airborne radiative measurements during CalNex and ARCTAS, *J. Geophys. Res.*, 117, D00V20, doi:10.1029/2012JD018106., 2012.

Successfully funded proposals:

Airborne measurements of hyper-spectral optical depth and retrievals of trace gas column contents and aerosol properties from 4STAR during KORUS-AQ, Co-Investigator (2016),
NASA HQ, Science Mission Directorate, Earth Science Division, approx. $550K (USD)

miniature unmanned airborne Sunphotometer for Sun-Tracking Atmospheric Research (muSSTAR), Science lead (2019), NASA Ames Internal Research and Development, approx. 200$K (USD)

Transitioning an existing near real-time MODIS cloud and above-cloud absorbing aerosol retrieval algorithm into a new MODIS/VIIRS continuity product , The Science of Terra, Aqua, Suomi NPP, and JPSS Series Satellites, NASA Earth Science Division, Co-Investigator (2021), 150$K (USD)

Professional formation, service, and miscellaneous:

Conference Session chair and co-convener for: Since 2016
- American Geophysical Union (AGU)
- The International Association of Meteorology and Atmospheric Sciences (IAMAS)
- American Meteorology Society (AMS) – Atmospheric Radiation

Peer reviewed articles for: Since 2011
- Journal of Geophysical Research: Atmospheres
- Atmospheric Measurement Techniques, and Journal of Geophysical research

Panelist reviewer for selecting NASA atmospheric science proposal (NPP, ROSES) Since 2017

Support for Atmospheric Observing System design (NASA decadal survey designated observable; suborbital observation planification) Since 2019

Holds a private pilot and a glider license. Since 2002