LEWIS R. BLAKE

lewisraeblake@gmail.com ◇ linkedin.com/in/lewisblake ◇ lewisblake.com

EDUCATION

Ph.D., Statistics, Colorado School of Mines — 2017 - 2021
Department of Applied Mathematics & Statistics — *Golden, CO*
Thesis: Enabling Massive Spatial Data Analysis

M.S., Statistics, Colorado School of Mines — 2017 - 2019
Department of Applied Mathematics & Statistics — *Golden, CO*

B.A., Mathematics, Hampshire College — 2012 - 2016
Minor concentrations in Computer Science, Agriculture, and Entrepreneurship — *Amherst, MA*

SKILLS

Computer: Python, R, Matlab, C++, PostgresSQL, git, Linux, MPI programming, CI/CD, Kubernetes
Packages: anemoi, scikit-learn, Keras, TensorFlow, PyTorch, Pandas, Numpy, xarray, dask, pytest
Communication: Oral presentation skills, technical writing, leadership
Language: English (Native), Norwegian (B2 reading / listening, B1 writing / speaking)

EXPERIENCE

Senior Software Developer — October 2025 - Present
Statkraft — Oslo, Norway

- Design, built, and deployed scalable Python microservices and ETL pipelines on Kubernetes to ingest and process large volumes of spatio-temporal data, integrating seamlessly with the GeoDTSS platform to serve stakeholders across the business.
- Expanded the observability stack by extending our probe to expose Prometheus metrics and developing Grafana dashboards to monitor forecast arrivals.

Researcher / Computational Scientist — March 2022 - Present
Norwegian Meteorological Institute — *Oslo, Norway*

- Lead development for the Python package pyaerocom, which provides tools for climate and air quality model analysis, and is used extensively throughout our projects from research through operations.
- Conduct meteorological analysis and lead development of machine learning models for air quality forecasting.
- Derived, planned, and implemented state-of-the-art methods for propagation of uncertainty and uncertainty quantification for advanced chemical transport models.
- Achieved significant advancements in pollution deposition modeling for Norway and air pollution in the Netherlands utilizing cutting-edge machine learning-based data fusion techniques.

Research Assistant — May 2018 - August 2021
NCAR - National Center for Atmospheric Research — *Boulder, CO*

- Developed and implemented highly efficient and parallel advanced statistical models (Multi-Resolution Approximation for Gaussian Processes), enabling processing of massive data sets while reducing computation times by 75%.
- Facilitated development of streamlined sea-surface temperature models through parameter reduction techniques and proposed strategies for efficient implementation in production.

Data Scientist — May 2020 - August 2020
Lumen Technologies — *Broomfield, CO*

- Developed and implemented advanced algorithms using time series LSTMs and CNNs to predict IT application health and detect anomalies, resulting in improved efficiency and cost savings.
- Automated exploratory data analysis workflows to improve diagnostics and operational efficiencies.

Research and Teaching Assistant August 2018 - December 2021
Colorado School of Mines *Golden, CO*

- Developed computational and theoretical tools to analyze massive, highly complex spatial data sets.
- Grader and teaching assistant for graduate courses in Spatial Statistics, Statistical Learning I & II, Statistics Practicum, Statistical Methods I, and Survival Analysis.

AmeriCorps Math Fellow August 2016 - June 2017
Denver Public Schools *Denver, CO*

- Enhanced middle school math education by providing personalized and small-group instruction to accelerate students' learning progress.
- Orchestrated after-school STEM programs, effectively managing resources and activities to promote student engagement and achievement.

Research Fellow May 2015 - May 2016
Four-College Biomath Consortium *Amherst, MA*

- Conducted innovative research on bovine water-intake in pasture.
- Developed cost-effective and efficient data collection tools using Arduino and C++.

SOFTWARE CONTRIBUTIONS & RESPONSIBILITIES

pyaerocom Python tools for climate and air quality model evaluation. Back-end for the AeroVal (aeroval.met.no) webpage.

Multi-Resolution Approximation DeepTreeMRA, MRA-Parallel, MRA-Serial: Matlab implementations of the Multi-resolution Approximation spatial statistical model for various computational infrastructures ranging from personal laptops to distributed high-performance computing systems.

optimparallel Parallel computing interface to the L-BFGS-B optimizer

cso Tools for assimilation of satellite data in regional air quality models.

pyaro Air quality reader interface for observations

aerovaldb Database combining aeroval and pyaerocom

PROFESSIONAL SERVICES

- Master's thesis co-adviser, Jenny Franziska Eder, *Assessing forcing-dependent AMOC tipping with machine learning*, University of Oslo, Fall 2025
- Referee for *The Annals of Applied Statistics*, *Environmetrics*, *Electronic Journal of Statistics*, *Journal of Computational and Graphical Statistics*
- Master's Thesis Sensor, Oslo Metropolitan University, Applied Computer and Information Technology, Mathematical Modelling and Scientific Computing, Spring and Fall 2024
- Master's Thesis Sensor, Norwegian University of Science and Technology, Department of Mathematical Sciences, Spring 2025

PUBLICATIONS

Journal Articles

[1] H. Huang, **Lewis R. Blake**, M. Katzfuss, and D. M. Hammerling, "Nonstationary spatial modeling of massive global satellite data," *Journal of Computational and Graphical Statistics*, 2024.

[2] H. Eskes, A. Tsikerdekis, M. Ades, M. Alexe, A. C. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, S. Chabrillat, R. Engelen, Q. Errera, J. Flemming, S. Garrigues, J. Griesfeller, V. Huijnen, L. Ilić, A. Inness, J. Kapsomenakis, Z. Kipling, B. Langerock, A. Mortier, M. Parrington, I. Pison, M. Pitkänen, S. Remy, A. Richter, A. Schoenhardt, M. Schulz, V. Thouret, T. Warneke, C. Zerefos, and V.-H. Peuch, "Technical note: Evaluation of the Copernicus Atmosphere Monitoring Service Cy48R1 upgrade of June 2023," *Atmospheric Chemistry and Physics*, vol. 24, no. 16, pp. 9475–9514, 2024.

[3] J. J. Wroblewski, E. Sanchez-Buenfil, M. Inciarte, J. Berdia, **Lewis Blake**, S. Wroblewski, A. Patti, G. Suter, and G. E. Sanborn, "Diabetic retinopathy screening using smartphone-based fundus photography and deep-learning artificial intelligence in the yucatan peninsula: A field study," *Journal of Diabetes Science and Technology*, vol. 0, no. 0, p. 19322968231194644, 2023. PMID: 37641576.

[4] **Lewis R. Blake**, E. Porcu, and D. M. Hammerling, "Parametric nonstationary covariance functions on spheres," *Stat*, vol. 11, no. 1, p. e468, 2022.

[5] P. Nesbitt, **Lewis R. Blake**, P. Lamas, M. Goycoolea, B. K. Pagnoncelli, A. Newman, and A. Brickey, "Underground mine scheduling under uncertainty," *European Journal of Operational Research*, vol. 294, no. 1, pp. 340–352, 2021.

[6] **Lewis R. Blake**, O. Khaliukova, A. Pinard, D. Nychka, D. Hammerling, and S. Bandyopadhyay, "Discussion on competition for spatial statistics for large datasets," *Journal of Agricultural, Biological and Environmental Statistics*, vol. 26, no. 4, pp. 596–598, 2021.

Technical Reports

[1] H. Fagerli, , E. Cecilie Ristorp Aas, A. Benedictow, **L. Blake**, W. van Caspel, B. Rolstad Denby, M. Gauss, D. Heinesen, H. Klein, G. Felix Lange, T. Lundin, E. Askov Mousing, A. Maxime Mortier, Á. Nyíri, D. Olivié, A. Segers, D. Simpson, S. Tsyro, M. Ulimoen, Á. Valdebenito, P. Wind, E. Grøtting Wærsted, *et al.*, "Transboundary particulate matter, photo-oxidants, acidifying and eutrophying components," in *EMEP Status Report 1/2025*, Norwegian Meteorological Institute, 2025.

[2] H. Eskes, A. Tsikerdekis, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, Q. Errera, A. Gkikas, J. Griesfeller, S. Basart, J. Kapsomenakis, B. Langerock, A. Mortier, M. O. de Beeck, I. Pison, M. Pitkänen, A. Richter, A. Schoenhardt, M. Schulz, V. Thouret, T. Warneke, and C. Zerefos, "Upgrade verification note for the CAMS near-real time global atmospheric composition service: Evaluation of the e-suite for the CAMS CY49R1 upgrade," Copernicus Atmosphere Monitoring Service, 2024.

[3] J. Kapsomenakis, A. Arola, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, E. Cuevas, Q. Errera, H. Eskes, A. Gkikas, J. Griesfeller, S. Basart, M. Kouyate, B. Langerock, A. Mortier, M. Pitkänen, I. Pison, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, J. Tarniewicz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos, "Validation report of the CAMS near-real-time global atmospheric composition service: Period March – May 2024," Copernicus Atmosphere Monitoring Service, 2024.

[4] H. Fagerli, A. Benedictow, **L. Blake**, W. van Caspel, B. Rolstad Denby, M. Gauss, J. E. Jonson, H. Klein, G. Felix Lange, E. Askov Mousing, Á. Nyíri, D. Olivié, A. Segers, D. Simpson, S. Tsyro, Á. Valdebenito, P. Wind, *et al.*, "Transboundary particulate matter, photo-oxidants, acidifying and eutrophying components," in *EMEP Status Report 1/2024*, Norwegian Meteorological Institute, 2024.

[5] I. Bouarar, A. Arola, A. Benedictow, Y. Bennouna, **L. Blake**, E. Cuevas, Q. Errera, H. Eskes, J. Griesfeller, S. Basart, J. Kapsomenakis, M. Kouyate, B. Langerock, A. Mortier, M. Pitkänen, I. Pison, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, J. Tarniewicz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos,

"Validation report of the CAMS near-real-time global atmospheric composition service: Period December 2023 – February 2024," Copernicus Atmosphere Monitoring Service, 2024.

[6] B. Langerock, A. Arola, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, E. Cuevas, Q. Errera, H. Eskes, J. Griesfeller, L. Ilic, J. Kapsomenakis, A. Mortier, I. Pison, M. Pitkänen, A. Richter, A. Schoenhardt, M. Schulz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos, "Validation report of the CAMS global reanalysis of aerosols and reactive trace gases, years 2003-2023," Copernicus Atmosphere Monitoring Service, 2024.

[7] T. Warneke, A. Arola, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, Q. Errera, H. J. Eskes, J. Griesfeller, L. Ilic´, J. Kapsomenakis, M. Kouyate, B. Langerock, A. Mortier, M. Pitkänen, I. Pison, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, J. Tarniewicz, V. Thouret, A. Tsikerdekis, and C. Zerefos, "Validation report of the CAMS near-real-time global atmospheric composition service Period September – November 2023," Copernicus Atmosphere Monitoring Service, 2024.

[8] M. Kouyate, A. Arola, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, E. Cuevas, Q. Errera, H. Eskes, J. Griesfeller, S. Basart, J. Kapsomenakis, B. Langerock, A. Mortier, M. Pitkänen, I. Pison, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, J. Tarniewicz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos, "Validation report of the CAMS near-real-time global atmospheric composition service Period June – August 2023," Copernicus Atmosphere Monitoring Service, 2024.

[9] H. Eskes, Y. Bennouna, **L. Blake**, Q. E. S. Basart, J. Kapsomenakis, B. Langerock, M. Pitkänen, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, T. Warneke, and C. Zerefos, "Observations used for the validation of the CAMS global products," Copernicus Atmosphere Monitoring Service, 2023.

[10] Y. Bennouna, A. Arola, A. Benedictow, **L. Blake**, I. Bouarar, E. Cuevas, Q. Errera, H. Eskes, J. Griesfeller, L. Ilic, J. Kapsomenakis, B. Langerock, A. Mortier, I. Pison, M. Pitkänen, A. Richter, A. Schoenhardt, M. Schulz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos, "Validation report of the CAMS global reanalysis of aerosols and reactive trace gases, period 2003-2022," Copernicus Atmosphere Monitoring Service, 2023.

[11] M. Pitkänen, A. Arola, Y. Bennouna, A. Benedictow, **L. Blake**, I. Bouarar, E. Cuevas, Q. Errera, H. Eskes, J. Griesfeller, S. Basart, J. Kapsomenakis, B. Langerock, A. Mortier, I. Pison, M. Ramonet, A. Richter, A. Schoenhardt, M. Schulz, J. Tarniewicz, V. Thouret, A. Tsikerdekis, T. Warneke, and C. Zerefos, "Validation report of the CAMS near-real-time global atmospheric composition service Period March – May 2023," Copernicus Atmosphere Monitoring Service, 2023.

[12] **Lewis R. Blake**, W. Aas, B. R. Denby, A.-G. Hjellbrekke, Q. Mu, D. Simpson, and H. Fagerli, "Deposition of sulfur and nitrogen in Norway 2017-2021," *MET report 03/2023*, 2023.

[13] H. Eskes, A. Tsikerdekis, A. Benedictow, Y. Bennouna, **L. Blake**, I. Bouarar, Q. Errera, J. Griesfeller, L. Ilic, J. Kapsomenakis, B. Langerock, A. Mortier, I. Pison, M. Pitkänen, A. Richter, A. Schoenhardt, M. Schulz, V. Thouret, T. Warneke, and C. Zerefos, "Upgrade verification note for the CAMS near-real time global atmospheric composition service: Evaluation of the e-suite for the CAMS CY48R1 upgrade of 27 June 2023," Copernicus Atmosphere Monitoring Service, 2023.

[14] **Lewis R. Blake**, H. Huang, B. Vanderwende, and D. Hammerling, "The deep-tree approach: An improved parallel matlab implementation of the multi-resolution approximation for massive spatial data on high-performance computing systems," *NCAR Technical Notes (NCAR/TN-565+ STR)*, 2021.

[15] H. Huang, **Lewis R. Blake**, and D. M. Hammerling, "Pushing the limit: a hybrid parallel implementation of the multi-resolution approximation for massive data," *NCAR Technical Notes (NCAR/TN-558+ STR)*, 2019.

[16] **Lewis R. Blake**, H. Huang, B. Vanderwende, and D. Hammerling, "A shallow-tree multi-resolution approximation for distributed and high-performance computing systems," *NCAR Technical Note (No. NCAR/TN-559+ STR)*, 2019.

[17] **Lewis R. Blake**, P. Simonson, and D. Hammerling, "Parallel implementation and computational analysis of the multi-resolution approximation," *NCAR Technical Notes (NCAR/TN-551+ STR)*, 2018.

Abstracts & Posters

[1] **Lewis Blake**, P. Wind, H. Fagerli, A. Valdebenito, I. Super, and J. Kuenen, "Analytical propagation of emission uncertainties into CAMS policy products," in *EGU General Assembly Conference Abstracts*, 2024.

[2] D. Hammerling, **Lewis Blake**, W. Daniels, A. Dykstal, and S. Crowell, "Student-led investigation of TROPOMI data for the US," in *EGU General Assembly Conference Abstracts*, p. 22133, 2020.

Theses

[1] **Lewis Rae Blake**, *Enabling Massive Spatial Data Analysis*. PhD thesis, Colorado School of Mines, 2022.

[2] **Lewis Rae Blake**, "Assume a spherical cow: Mathematical modeling of bovine dynamical systems," Bachelor's Thesis, Hampshire College, 2016.