Philippine Burdeau

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Education

Stanford University, Doerr School of Sustainability 2022 – 2026
PhD in Energy Science and Engineering under the supervision of Prof. Adam Brandt Stanford, California

- Statistical methods for quantifying methane emissions from measurement data
- Areas: geostatistics, bayesian inference, emission inventory reconciliation, remote sensing

Università Bocconi 2020 – 2022
MSc in Politics and Policy Analysis Milan, Italy

- Master thesis: determining optimal conditions for a CCS network in Italy using a cooperative game theory model
- Areas: game theory, public economics, social and economic networks

École Polytechnique 2017 – 2021
MSc in Science and Engineering - Grandes Ecoles / Ingénieur Polytechnicien Program Palaiseau, France

- Areas: applied mathematics, modern physics

Lycée Sainte-Geneviève 2015 – 2017
Preparatory school for the French Grandes Ecoles (MPSI - MP*) Versailles, France

- Areas: mathematics, physics

Research and Work Experience

Environmental Assessment and Optimization Group - Research Assistant Sept 2022 - Now
Prof. Adam Brandt's research group Stanford, California

- Working on statistical methods for quantifying methane leaks and estimating their impact, and on the design, implementation and analysis of data from controlled release experiments

Insight M - Research Intern Jun - Aug 2024
Methane emissions management company Sunnyvale, California

- Updating and improving a stochastic bottom-up model for predicting methane emissions

Kearney - Business Analyst Intern May - Nov 2021
Global consulting firm Paris, France

- Within the Kearney's Energy Transition Institute, drafted a techno-economic report on Carbon Emissions Management
- Supported due diligence for a car insurer evaluating startup partnerships and acquisitions

France Stratégie Economics department - Research Intern Apr - Aug 2020
Policy advisory agency to the French Prime Minister Paris, France

- Defined a socio-economic formula of the costs of greenhouse gas abatements in the French building sector
- Built and programmed a physics-based model to assess the efficiency of thermal renovations

École Polytechnique – Scientific Group Project Sep 2018 – Jun 2019
Student-led research project supervised by Prof. Emmanuel Joffre and Prof. Daniel Suchet Palaiseau, France

- Built a quantum remote laboratory in a group of 5 students
- `quantum-physics.polytechnique.fr`

Systra - Assistant Manager Intern June - Aug 2019
Leading engineering group in transportation solutions (6,700 people, €380m turnover) Paris, France

- Supported the manager of a team of 20 railway project managers and assisted them on their worksites

French Navy - Officer Sept 2017 - May 2018
Human and military training on a military base Noumea, New-Caledonia

- Worked as an advisor to the Naval Base Commander and integrated a navy crew for a mission in the Pacific Ocean

PUBLICATIONS

Carbon Intensity of United States Natural Gas Supply 2025
Zhang, Z., Rutherford, J., Littlefield, J., Ramadan, F., Ali Saafi, M., Ren, B., Y Jabbar, M., Saad, D., ***Burdeau P.****, Masnadi, M., Brandt, A.*
Environmental Science & Technology (in review)

Controlled release testing of commercially available methane emission measurement technologies at the TADI facility 2025
McManemin, A., Juéry, C., Blandin, V., France, J.L., ***Burdeau P.****, Brandt, A.*
Atmospheric Measurement Techniques (in review) - `preprint`

High-resolution national mapping of natural gas composition substantially updates methane leakage impacts 2025
Burdeau P.*, Sherwin E., Berman E., Biraud S., Brandt, A.*
Nature Communications (accepted *in principle*) - `preprint`

Single-blind test of nine methane-sensing satellite systems from three continents 2024
Sherwin, E., El Abbadi, S., ***Burdeau, P.****, Zhang, Z., Chen, Z., Rutherford, J., Chen, Y., Brandt, A.*
Atmospheric Measurement Techniques - `link`

Technological maturity of aircraft-based methane sensing for greenhouse gas mitigation 2024
El Abbadi, S., Chen, Z., ***Burdeau, P.****, Rutherford, J., Chen, Y., Zhang, , Sherwin, E., Brandt, A.*
Environmental Science & Technology - `link`

Comparing continuous methane monitoring technologies for high-volume emissions: a single-blind controlled release study 2024
Chen, Z., El Abbadi, S., Sherwin, E., ***Burdeau, P.****, Rutherford, J., Chen, Y., Zhang, Z., Brandt, A.*
ACS ES&T Air - `link`

Comprehensive evaluation of aircraft-based methane sensing for greenhouse gas mitigation 2023
El Abbadi, S., Chen, Z., ***Burdeau, P.****, Rutherford, J., Chen, Y., Zhang, Z., Sherwin, E., Brandt, A.*
EarthArXiv preprint - `link`

Independent evaluation of methane sensing satellites, airplanes, and continuous monitoring ground sensors 2023
El Abbadi, S., Chen, Z., ***Burdeau, P.****, Rutherford, J., Chen, Y., Sherwin, E., Zhang, Z., Brandt, A.*
AGU Fall Meeting Abstracts - `link`

Carbon emissions assessment: towards accurate control 2022
Burdeau, P.*, Debarre, R., Gahlot P., Grillet, C.*
Kearney Energy Transition Institute Report - `link`

TALKS

AGU25 poster session SY41C: Statistical inference of intermittent methane emissions from heterogeneous measurements 2025

Stanford ESE in 2025 poster session: High-resolution national mapping of natural gas composition substantially updates methane leakage impacts 2025

Methane Emissions Technology Alliance (META) Seminar (Stanford University & LBNL) - `recorded` 2024

CEOS side meeting at IWGGMS (CNES, Paris) 2023

HONORS AND AWARDS

First place in the `Stanford ESE in 2050` poster contest (awarded to 1 poster out of 33) 2025

Best Scientific Group Project Prize (awarded to 3 groups out of 120) 2019

Academic Service

Reviewer, ACS ES&T Air — 2024, 2025

Reviewer, Tackling Climate Change with Machine Learning at ICLR — 2025

Reviewer, Climate Change AI Innovation Grants Program — 2024

Teaching Experience

Course Assistant - Optimization — Apr – Jun 2024
Instructor: Prof. Adam Brandt (Stanford University)

Teaching Assistant in Preparatory School - Physics — Sept 2018 – May 2019
Instructor: Prof. Niels Vandecasteele (Lycée Sainte-Genevieve)

- Prepared students for a nationwide ranked exam (X/ENS/Centrale/Mines)

Software

Code for: High-resolution national mapping of natural gas composition substantially updates methane leakage impacts - `github.com/pburdeau/us_gas_composition` - `doi:10.5281/zenodo.17246906` — 2025

Interactive U.S. map of produced gas composition - `pburdeau.github.io/us_map_gas_composition` - `doi:10.5281/zenodo.17246945` — 2025

`BU_methane_model` - `github.com/JSRuthe/BU_methane_model` (python version) — 2024

Skills

Languages
English (TOEFL 110, professional proficiency), French (Native), Italian, German

Programming
Python; C++; Matlab; proficiency in Julia, R, Stata, VBA and Java

Extracurriculars

Writing & Journalism
École Polytechnique alumni network's journal (20k circulation)

- Core member of the journal's editorial committee
- Wrote articles for the 50th anniversary of the school opening to women - `Read article`

Music
Piano (19 years, baroque music)