

# LOUIS RIVOIRE

## Postdoctoral Associate

Massachusetts Institute of Technology, Cambridge, MA  
Department of Earth, Atmospheric and Planetary Sciences

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## EDUCATION

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**Ph.D., Atmospheric Science** 2020  
Colorado State University, *Fort Collins, CO*

**M.S., Ocean, Atmosphere, Climate, and Remote Sensing** 2015  
Sorbonne University, *Paris, France*

**Diplôme de l'Ecole Normale Supérieure** 2015  
Advanced interdisciplinary research training, *Paris, France*

**B.S., Earth Sciences** 2013  
Ecole Normale Supérieure, *Paris, France*

**Classes Préparatoires aux Grandes Ecoles (CPGE)** 2010-2012  
Intensive program in mathematics, physics, life sciences, and humanities, *Lyon, France*

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## PROFESSIONAL EXPERIENCE

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**Postdoctoral Associate** since Jan 2024  
Massachusetts Institute of Technology, *Cambridge, MA*  
Department of Earth, Atmospheric, and Planetary Sciences

**Flight Mission Contributor** Dec 2021 - Nov 2023  
Jet Propulsion Laboratory, California Institute of Technology, *Pasadena, CA*  
Providing expertise for the development of a satellite mission

**Postdoctoral Fellow** Jul 2020 - Dec 2023  
Harvard University, *Cambridge, MA*  
Department of Earth and Planetary Sciences  
Note: disruptions in employment due to covid-19 and visa processing issues

**Graduate Research and Teaching Assistant** Aug 2015 - May 2020  
Colorado State University, *Fort Collins, CO*  
Department of Atmospheric Sciences

**Climate Dynamics Intern** Mar - Jul 2015  
Colorado State University, *Fort Collins, CO*

**Atmospheric Chemistry Intern** Mar - Jul 2014  
National Center for Atmospheric Research, *Boulder, CO*

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## RESEARCH OBJECTIVES

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Improve **jet stream tracking** to assess changes due to global warming and increasingly frequent extreme weather events.

Develop tools rooted in **signal detection theory** to leverage the full power of the historical record, answer pressing questions about highly uncertain climate signals, and design future observing platforms.

Characterize **large-scale transport** in the atmosphere using Lagrangian tools and spectral clustering, to quantify human exposure to ozone and wildfire smoke.

Quantify uncertainties in the outcomes of **climate intervention technologies** and warn against unintended consequences for already vulnerable populations.

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## PUBLICATIONS

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### Published

4. **L. Rivoire**, M. Linz, J. Li, Observational limitations to the emergence of climate signals, *Geophys. Res. Lett.*, 2024.
3. **L. Rivoire**, T. Birner, J. A. Knaff, N. Tourville, Quantifying the radiative impact of clouds on tropopause layer cooling in tropical cyclones, *Journal of Climate*, 2020.
2. W. J. Randel, **L. Rivoire**, L. L. Pan, S. Honomichl, Dry layers in the tropical troposphere observed during CONTRAST and global behavior from GFS analyses, *J. Geophys. Res.*, 2016.
1. **L. Rivoire**, T. Birner, J. A. Knaff, Evolution of the upper-level thermal structure in tropical cyclones, *Geophys. Res. Lett.*, 2016.

### In review

H. Garny and co-authors including **L. Rivoire**, Age of stratospheric air: Progress on processes, observations and long-term trends, *Reviews of Geophysics*, 2024.

### In preparation

- L. Rivoire**, M. Linz, P. Lin, J.N. Neu, co-authors, Detectability of trends in stratospheric ozone, *in prep for ACP*.
- L. Rivoire**, J. Curbelo, co-authors, Tracking atmospheric jets as Lagrangian objects, *in prep for PNAS*.

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## AWARDS, HONORS, AND GRANTS

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### Visiting Scientist Grant

Sep - Oct 2023

International Programme for Research in Groups, Center for Mathematical Research  
Universitat Autònoma de Barcelona, *Barcelona, Spain*

### Programs of Research and Scholarly Excellence Award

2015

Colorado State University, *Fort Collins, CO*

### Travel Grant

2019

19th Cyclone Workshop, *Kloster Seeon, Germany*

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## TEACHING AND MENTORING

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### Research Mentoring Training Certificate

2024

Massachusetts Institute of Technology, *Cambridge, MA*

### Leadership and Professional Strategies & Skills Training Certificate

2024

Massachusetts Institute of Technology, *Cambridge, MA*

### Student Research Advisor

2022

Harvard College, <i>Cambridge, MA</i>	
<b>Graduate Student Mentor</b>	2022
Harvard University, <i>Cambridge, MA</i>	
<b>Teaching Assistant, Atmospheric Dynamics II</b>	2016
Colorado State University, <i>Fort Collins, CO</i>	
<b>Student Intern Advisor</b>	2016, 2019
Colorado State University, <i>Fort Collins, CO</i>	

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## CONFERENCE PRESENTATIONS

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### Orals

European Geosciences Union General Assembly, <i>Vienna, Austria</i>	2024
European Geosciences Union General Assembly, <i>Vienna, Austria</i>	2023
European Geosciences Union General Assembly, <i>Vienna, Austria</i>	2022
102nd Annual Meeting of the American Meteorological Society, <i>online</i>	2022
34th AMS Conference on Hurricanes and Tropical Meteorology, <i>online</i>	2021
19th Cyclone Workshop, <i>Kloster Seeon, Germany</i>	2019
Front Range Tropical Cyclone Workshop, <i>Fort Collins, CO</i>	2018
NOAA Center for Satellite Applications and Research Symposium, <i>Madison, WI</i>	2018
32nd AMS Conference on Hurricanes and Tropical Meteorology, <i>San Juan, PR</i>	2016

### Posters

Stratospheric Processes And their Role in the Climate (SPARC) General Assembly, <i>Boulder, CO</i>	2022
33rd AMS Conference on Hurricanes and Tropical Meteorology, <i>Ponte Vedra, FL</i>	2018
49th Fall Meeting of the American Geophysical Union, <i>San Francisco, CA</i>	2016
Young Scientist Symposium on Atmospheric Research, <i>Fort Collins, CO</i>	2015

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## INVITED LECTURES AND SEMINARS

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Universitat Autònoma de Barcelona, Center for Mathematical Research, <i>Barcelona, Spain</i>	2023
French and German Consulates, <i>Boston, MA</i>	2021
Colorado State University, Department of Atmospheric Science, <i>Fort Collins, CO</i>	2021
National Center for Atmospheric Research, <i>Boulder, CO</i>	2019
Colorado State University, Department of Atmospheric Science, <i>Fort Collins, CO</i>	2016

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## SERVICE AND LEADERSHIP

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### Peer review

Reviewer for Research Opportunities in Space and Earth Science (ROSES) panels NASA Headquarters, <i>Washington, D.C.</i>	2017, 2019
Student Proposal Reviewer for Harvard College Research Program Harvard University, <i>Cambridge, MA</i>	2022, 2023, 2024

Peer Reviewer for:

Nature Communications	J Geophys Res	Bull Am Meteorol Soc	Atmos Sci Lett
Q J R Meteorol Soc	Atmos Chem Phys	Int J Climatol	Ann Geophys
Marine Pollution Bulletin	Int. J. Remote Sens.		

### Professional meetings

Session Lead Convener	2023, 2024
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European Geosciences Union General Assembly, *Vienna, Austria*

Student Poster Award Judge	2023
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European Geosciences Union General Assembly, *Vienna, Austria*