

# Simon Treillou

PhD in Oceanography · French citizen · he/his

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ORCID 0000-0002-5484-655X | 🏠 Baker Coastal Lab

## Professional Experience

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### Civil and Environmental Engineering at Stanford University

Stanford, CA, USA

#### Postdoctoral researcher

Feb. 2025 - present

- Advisor: Dr. Christine M. Baker

### IRD (French Institute for Research and Development)

Toulouse, France

#### Ph.D. student

Sep. 2021 - Nov. 2024

- Title: "Surfzone eddies and undertow vertical shear effects on tracer dispersion: a 3D wave-resolving model approach"
- Advisor: Dr. Patrick Marchesiello

### UCLA

Los Angeles, USA

#### Visiting Scholar

June 2022 - August 2022

- Visit to James McWilliams' team

### CIRAD (French Institute for Research in Agronomy)

Montpellier, France

#### M.S. Intern

2021

- Title: Revisiting bio-physical standard models
- Advisor: Dr. Rémi Vezy, Dr. Emilie Peynaud

### IRD (French Institute for Research and Development)

Toulouse, France

#### M.S. Intern

2020

- Title: Modeling of internal waves generation by a seamount
- Advisor: Dr. Patrick Marchesiello

### Merci René

Toulouse, France

#### Bachelor Intern

2019

- Internship in the Social and Circular Economy
- Association specializing in reused, recycled and new furniture.

## Education

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### University of Toulouse

Toulouse, France

#### Ph.D. Coastal Oceanography

2021 - 2024

### INSA - University of Toulouse

Toulouse, France

#### M.Sc. Applied Mathematics

2016 - 2021

### PUCP - Pontificia Universidad Catolica de Peru

Lima, Peru

#### Exchange semester Applied Mathematics

2019

## Publications

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### Published

- Treillou, S.**, Vezy, R., Mackeown, S., Peynaud, Perez, R.P.A, Arsouze, T., Dauzat, J. (2025). PlantBiophysics.jl: PlantBiophysics.jl: A High-Performance, Modular Software for Prototyping and Scaling Biophysical Models from Leaf to Canopy. in *in silico Plants*, XX XXXX. DOI:10.1093/insilicoplants/diaf021
- Treillou, S.**, Marchesiello, P., Baker, C.M., McWilliams, J., Dumas, F. (2025). Tracer dispersion by surfzone eddies: assessing the impact of undertow vertical shear. *Journal of Physical Oceanography*, 55, 1211–1234. DOI:10.1175/JPO-D-24-0236.1
- Treillou, S.** (2024). Surfzone eddies and undertow vertical shear effects on tracer dispersion: a 3D wave-resolving model approach (doctoral dissertation)
- Treillou, S.**, Marchesiello, P. (2024). Effects of vertical shear on tracer dispersion in the nearshore area. XVIIIèmes Journées Nationales Génie Côtier - Génie Civil, Chatou, 205-214. DOI:10.5150/jngcgc.2024.022
- Treillou, S.**, Marchesiello, P., Baker, C.M. (2024). Correction of coherent interference in wave-resolving nearshore models and validation with experimental data. *Ocean Modelling*, 189, 102369. DOI:10.1016/j.ocemod.2024.102369
- Marchesiello, P., **Treillou, S.** (2023). Correction of GLS turbulence closure for wave-resolving models with stratification. *Ocean Modelling*, 184, 102212. DOI:10.1016/j.ocemod.2023.102212
- Treillou, S.**, Marchesiello, P. (2022). Impact of 3D non-hydrostatic dynamics on tracer transport in the nearshore region. XVIIèmes Journées Nationales Génie Côtier - Génie Civil, Chatou, 191-200. DOI:10.5150/jngcgc.2022.021

### In Preparation

### Software

- Vezy, R., **Treillou, S.** (2023) VEZY/PlantBiophysics.jl: V0.7.0 (v0.7.0) [Computer software]. Zenodo. DOI:10.5281/zenodo.7545169

## Presentations

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\* *presenting author*;

### Conferences

- Treillou\*, S.**, Baker, C.M, Marchesiello, P., 2025: « On the vertical structure of nearshore eddies in wave-resolving simulations ». YCSEC-A 2025, Wilmington, NC, USA.
- Treillou\*, S.**, Baker, C.M, 2025: « On the vertical structure of nearshore eddies in wave-resolving simulations ». Coastal Ocean Dynamics GRC 2025, New London, NH, USA.
- Marchesiello\*, P., **Treillou, S.**, 2024: « Mechanisms of surfzone mixing in a 3D wave-resolving model ». ICCE 2024, Roma, Italy.
- Treillou\*, S.**, Marchesiello, P. 2024: « Effects of vertical shear on tracer dispersion in the nearshore area ». Revue Paralia. Journées Nationales Génie Côtier – Génie Civil 2024. DOI:10.5150/jngcgc.2024.022
- Treillou\*, S.**, Marchesiello, P.: « Impact of 3D non-hydrostatic dynamics on tracer transport in the nearshore region ». EGU General Assembly 2023, Vienna, Austria, 24–28 Apr 2023, EGU23-7843, DOI:10.5194/egusphere-egu23-7843, 2023.
- Vezy\*, R., Perez, R., **Treillou, S.**, Arsouze, T., Dauzat, J.: « PlantBiophysics.jl: a set of Julia packages for fast and easy calibration, prototyping and simulation of plant models ». FSPM 2023, DOI:10.13140/RG.2.2.17692.16004
- Treillou\*, S.**, P. Marchesiello, 2022: « Impact of 3D nonhydrostatic dynamics on tracer transport in the nearshore region ». Revue Paralia. Journées Nationales Génie Côtier – Génie Civil 2022. DOI:10.5150/jngcgc.2022.021

### Seminars

- Treillou\*, S.**: « Surfzone eddies and undertow vertical shear effects on tracer dispersion » Stanford EFML Seminars, CA, USA. March 2025

**Treillou\*, S.**, Marchesiello, P.: « How do 3D non-hydrostatic dynamics affect transport in the nearshore region ? » Scripps Institution of Oceanography, San Diego, CA, USA. July 2023

**Treillou\*, S.**, Marchesiello, P.: « How do 3D non-hydrostatic dynamics affect transport in the nearshore region ? » UCLA, Los Angeles, CA, USA. June 2023

## Workshops

Marchesiello\*, P., **Treillou, S.**, Debreu, L., Auclair, F., McWilliams, J.C., Almar, R., Benshila, R., Dumas, F.: « Surf eddies and mixing in 3D wave-resolving models ». Journées de Modélisation des Vagues à Phases Résolues, Ile d'Aix, October 2023.

**Treillou\*, S.**, Marchesiello, P.: « How do 3D non-hydrostatic dynamics affect transport in the nearshore region ? ». CROCO Users Meeting, Marseille, September 2023.

Marchesiello\*, P., **Treillou, S.**: « 3D transient rip currents in a wave-resolving model ». B'Waves, Bordeaux, June 2023.

## Short Talks

**Treillou\*, S.**, Marchesiello, P.: « How do 3D non-hydrostatic dynamics affect transport in the nearshore region ? ». LEGOS PhD Day, Toulouse, December 2023.

## Teaching Experience

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2025-2026	<b>Coastal processes</b>   Teaching Assistant (1 lecture)	Stanford University, USA
2024-2025	<b>Ocean waves</b>   Teaching Assistant (1 lecture)	Stanford University, USA
2024-2025	<b>Dynamical systems</b>   Teaching Assistant	INSA, France
2021-2022	<b>Mathematical modeling initiation</b>   Teaching Assistant	INSA, France

## Field & Lab Experience

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2025	<b>blabla</b>	Visksburg, MS, USA
2021	<b>Topography measurements of the sandy tongue of Saint-Louis</b>	Saint-Louis, Sénégal

## Professional service

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**Reviewer** Journal of Physical Oceanography (1)  
**Reviewer** Ocean Dynamics (1)  
**Reviewer** Nature Scientific Reports (1)

## Skills

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**Programming** Python, Matlab, Julia, Unix  
**Software** CROCO, FUNWAVE-TVD, SWASH

## Outreach & Professional Development

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### Involvement

2023-2024	<b>LEGOS Laboratory Council</b>	Graduate Student Representative	Toulouse
2020-2021	<b>INSA Applied Mathematics Department Council</b>	Student Representative	Toulouse
2019-2020	<b>INSA Undergraduate Student Association</b>	Culture Department Leader	Toulouse
2016-2018	<b>INSA Humanitarian Association</b>	Vice-President	Toulouse

## Languages

**French** (native), **Spanish** (C2), **English** (C1)

## Organization

2023	<b>LEGOS Scientific Day</b>	organized by Graduate students	Toulouse
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## Outreach

2025	<b>Ocean's Week</b>	Participant	Half Moon Bay primary school
2024	<b>National Science Festival</b>	Participant	Occitanie
2023	<b>Internship middle-school students welcoming at LEGOS</b>	Participant	Toulouse
2022	<b>« Climate Fresk » training</b>	collaborative game to raise awareness of climate change   Participant	Toulouse
2022	<b>Scientilivre</b>	science festival   Participant	Toulouse

## Engagement

2018	<b>International solidarity mission</b>	Tamil Nadu, India
2017	<b>International solidarity mission</b>	Tamil Nadu, India

## Awards

2015	<b>National Resistance and Deportation Contest</b>	Resistance and Deportation Museum	Collective award-winner
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