Dr Vaibhav Vijay **Ingale**

Green Foundation Post-Doctoral Scholar at Scripps Institution of Oceanography
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Research Interests

Geophysicist specializing in earthquake detection, seismic catalog development, and waveform analysis using dense hydroacoustic and global seismic networks. Experienced in both real-time and post-processed seismic data analysis, source quantification, and microseismic event detection. Skilled in integrating seismological, bathymetric, magnetic, and hydroacoustic datasets with advanced machine learning methods to detect and characterize submarine geohazards such as volcanic eruptions, landslides, mid-ocean ridge and subduction zone processes.

Education

Ph.D. in Marine Geoscience — *Brest, France*
Lab Geo-Ocean, University of Brest, CNRS and Ifremer — *October 2020 - October 2023*
- Thesis Supervisors: **Dr Jean-Yves Royer** and **Dr Sara Bazin**

International Masters (M2) in Solid Earth Science — *Paris, France*
Institut de Physique du Globe de Paris (IPGP) — *September 2018 - June 2019*
- Discipline: Geophysics

Dual Degree BSMS — *Pune, India*
Indian Institute of Science Education and Research (IISER) — *August 2014 - October 2019*
- Discipline: Physics and Earth-Climate Science

Employment

Green Foundation Post-Doctoral Scholar — *La Jolla, CA, USA*
Scripps Institution of Oceanography — *May 2024 - Current*
- Supervisor: **Dr Ross Parnell-Turner**
- Theme: Seismic, hydroacoustic, magnetic data analysis along mid-ocean ridges and subduction zones

Geophysical Engineer — *Paris, France*
Marine Geoscience Laboratory, IPGP — *October 2019 - October 2020*
- Supervisor: **Dr Satish C Singh**
- Theme: Geophysical modeling and seismic survey experiment designing

List of Publications

Peer Reviewed

1. **Ingale, V. V.**, Tepp, G., Dziak, R. P., Parnell-Turner, R. (2025). Detection and Analysis of Aleutian Arc Seismicity (2022-2023) Using an Autonomous Hydrophone Array, *Geochemistry, Geophysics, Geosystems*, 26, e2025GC012320 (Link).

2. Bazin, S., Raumer, P.-Y., Lavayssière, A., Fauvel, H., Safran, R., **Ingale, V. V.**, Tanrin, J., Vergoz, J., Royer, J.-Y., and Korenaga, J. (2025). Monitoring underwater eruptions using networks of hydrophones in the

SOFAR channel, *Underwater Acoustics Conference and Exhibition Series*, Macedonia, Greece (Link).

3. **Ingale, V. V.**, Parnell-Turner, R., Fan, W., Talling, P., and Neasham, J., (2025). Hydroacoustic signals recorded by CTBTO network suggest a possible submarine landslide in Trou Sans Fond Canyon, offshore Ivory Coast, March 2024, *Seismological Research Letters*, 96(4), 2253-2263 (Link).

4. Raumer, P.-Y., Bazin, S., Cazau, D., **Ingale, V. V.**, and Royer, J-Y. (2024). Hydroacoustic reference datasets for benchmarking geophonic signal detections, *Seismica*, 3(2) (Link).

5. **Ingale, V. V.**, Bazin S., and Royer J-Y. (2023). Energetic and short water-born signals from mid-oceanic ridges, *Underwater Acoustics Conference and Exhibition Series*, Kalamata, Greece (Link).

6. **Ingale, V. V.**, Bazin, S., Olive, J.-A., Briais, A., and Royer, J.-Y. (2023). Hydroacoustic study of a seismic swarm in 2016-2017 near Melville Transform Fault on the Southwest Indian Ridge, *Bulletin of Seismological Society of America*, 113 (4): 1523-1541, (Link)

7. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2021). Hydroacoustic observations of two contrasted seismic swarms along the Southwest Indian Ridge in 2018, *Geosciences*, 11, 225, (Link)

8. **Ingale, V.**, and Singh, S. C. (2021). Insights from synthetic Seismogram modeling study of the oceanic lower crust and Moho Transition Zone, *Tectonophysics*, 229030, (Link)

Submitted

1. **Ingale, V. V.**, Fan, W., and Parnell-Turner, R. Tidally triggered seismicity along the Quebrada-Discovery-Gofar oceanic transform fault system, *Geophysical Research Letters*

In Preparation

1. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. Hydroacoustic study of seismic swarms between 2012 and 2020 along the Southeast Indian Ridge, *Geochemistry, Geophysics, Geosystems*

2. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. Seismoacoustic study of seismic swarms along the Central Indian Ridge, *Geochemistry, Geophysics, Geosystems*

3. **Ingale, V. V.**, Gee, J., and Parnell-Turner, R. A modular framework for processing and interpreting magnetic field data collected by underwater vehicles along mid-ocean ridges, *Applied Geophysics*

4. Gong, Z. K., Parnell-Turner, R., Anderson, E., and **Ingale, V. V.**, et al. Diking and Cracking Recorded by Microseismicity and Vent Fluid Temperatures at the East Pacific Rise, 9°50'N, *Journal of Geophysical Research*

Conference Proceedings

1. **Ingale, V. V.**, Tepp, G., Dziak, R. P., Parnell-Turner, R. (2025). Detection of Alaska-Aleutian Arc seismicity using hydroacoustic data, *Alaska-Aleutian-Arc Workshop*, Anchorage, USA.

2. **Ingale, V. V.**, Parnell-Turner, R., Fan, W., Talling, P. (2025). Hydroacoustic observations of a submarine landslide along Trou Sans Fond Canyon offshore Ivory Coast in March 2024 on CTBTO network, *EGU General Assembly 2025*, Vienna, Austria.

3. **Ingale, V. V.**, Parnell-Turner, R., Fan, W., Talling, P. (2024). Hydroacoustic detection of potential submarine landslide signal offshore Ivory Coast, March 2024, *AGU Fall Meeting 2024*, Washington DC, USA.

4. **Ingale, V. V.**, Tepp, G., Dziak, R. P., Parnell-Turner, R. (2024). Hydroacoustic analysis of seismic activity in the Aleutian subduction zone and volcanic arc in 2022, *AGU Fall Meeting 2024*, Washington DC, USA.

5. Bazin, S., Royer, J.-Y., Raumer, P.-Y., **Ingale, V. V.**, Lavayssière, A., and Tanrin, J. (2024). Surveillance hydroacoustique des volcans et des dorsales océaniques, *SERENADE 2024*, Toulon, France.
6. Raumer, P.-Y., Bazin, S., Cazau, D., **Ingale, V. V.**, Lavayssière, A., and Royer, J-Y. (2024). Hydroacoustic geophony automatic detection: an open benchmark dataset with an open model, *EGU General Assembly 2024*, Vienna, Austria.
7. **Ingale, V. V.**, Raumer, P.-Y., Bazin, S., and Royer, J.-Y. (2023). Detection of T-waves associated with mid-ocean ridge seismicity recorded by hydroacoustic networks: manual versus automatic approaches, *Science and Technology Conference (SnT)*, Vienna, Austria.
8. Raumer, P.-Y., Bazin, S., Cazau, D., **Ingale, V. V.**, et al., (2023). Application of machine learning to hydroacoustic volcanic event detections, *HPC Workshop-Nuclear Explosion Monitoring*, Vienna, Austria.
9. Raumer, P.-Y., Bazin, S., Cazau, D., **Ingale, V. V.**, et al., (2023). Application of machine learning to hydroacoustic seismic and magmatic events detections, *EGU General Assembly 2023*, Vienna, Austria.
10. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2022). Hydroacoustic detections of seismic clusters along the mid-ocean ridges in the Indian Ocean using hydrophones of CTBTO and OHASISBIO network, *International Hydroacoustic Workshop*, Vienna, Austria.
11. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2022). Hydroacoustic observations of a seismic cluster at Melville Fracture Zone along the Southwest Indian Ridge in 2016-17. *SERENADE Conference*, Brest, France.
12. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2022). Hydroacoustic observations of a seismic cluster at Melville Fracture Zone along the Southwest Indian Ridge in 2016-17. *EGU General Assembly 2022*, Vienna, Austria.
13. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2022). Hydroacoustic observations of seismic swarms along the Southwest Indian Ridge of the Indian Ocean. *International Indian Ocean Science Conference*, Goa, India.
14. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2021). Hydroacoustic detections of seismic swarms along mid-ocean ridges in the Indian Ocean. *EMSO Time Series Conference on Observing Ocean Sound*, PLOCAN, Gran Canaria.
15. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2021). Hydroacoustic observations of two contrasted seismic swarms along the Southwest Indian Ridge in 2018. *EGU General Assembly 2021*, online.
16. Singh, S. C., Vaddineni, V., **Ingale, V.**, and Okazaki, K., The Oman Drilling Project Phase 2 Science Party (2020). Mohorovicic Discontinuity: What we know, what we don't know, and what should be done? *International Conference on Ophiolites and the Oceanic Lithosphere*, Muscat, Oman.
17. Fuji, N., **Ingale, V.**, Li, L., Jacob, A., Lognonné, P., Panning, M., Ceylan, S., Stähler, S., Clinton, J., Driel, M. V., and Banerdt, B. (2019). One-station wavefield back-propagation for Mars quake detection. *EGU General Assembly 2019*, EGU19-7417, Vienna, Austria.

Awards

1. May 2024 - April 2026: *Green Foundation Fellowship* for Post-doctoral work
2. October 2020 - October 2023: *ISblue and Région Bretagne Fellowships* for PhD thesis
3. September 2018 - June 2019: *GPX Scholarship* for International Masters
4. August 2017 - June 2018: *Infosys Foundation Scholarship* for dual degree BSMS
5. August 2014 - July 2019: *Govt of India's DST-INSPIRE Fellowship* for dual degree BSMS
6. June 2010 - May 2014: *Govt of Maharashtra's Talent Search Examination Scholarship*

Peer Review

- *Geosciences, Earthquake Science, Seismica, RAS Techniques and Instruments* Journals

Skills

- **Programming Languages**: Python, Shell Scripting (Bash), MATLAB, IDL
- **Machine Learning**: Tensorflow, Sklearn, CNN, DBSCAN
- **Geophysical Analysis**:
  - Seismology: ObsPy, Seismic Analysis Code (SAC), Seismic Unix
  - Seafloor Imaging: QGIS, MB-system, Generic Mapping Tools (GMT)
  - Hydroacoustic: Seasick
  - Catalog development: automatic detection, association, magnitude estimation, relocation
- **Packages**: Microsoft Office, LaTeX, GNU Image Manipulation Program, Singular Vector Graphics
- **Operating Systems**: Linux, Unix, macOS, Windows
- **Language Proficiency**: English (Fluent), French (Intermediate), Hindi (Fluent), Marathi (Native)

Ocean Expedition

1. Nov-Dec 2024: **Shipboard scientist** on R/V *Atlantis (AT50-31)* at the Southern East Pacific Rise (17°S)
   - Seafloor imaging by AUV Sentry, towed magnetic survey and rock sampling by HOV Alvin
   - **Scientific observer**, HOV Alvin dive 5284, at 17°21'S, 113°11'S (depth 2661 m).
2. Jan-Mar 2022: **Shipboard scientist** on R/V *Marion Dufresne* to the Southern Indian Ocean
   - Recover and deploy autonomous underwater hydrophones of the OHASISBIO project

Field Work

1. *Living Faults in Greece* field work to study the effect of seismic activity on the geological signature and features of various marine terraces (May 2019)
2. *Geological fieldwork in the Lesser Himalayas* to study geological features like folds, faults, and thrust zones and observe their orientation (Oct 2017)

Mentorship

1. **Neha Narayanan**: Undergraduate student
2. **Zoe Gong**: Undergraduate student

Work Experience

Marine Geophysical Data Analysis (Post-Doctoral Work) *La Jolla, CA, USA*

Organization: Scripps Institution of Oceanography *May 2024 - Current*

- Develop machine learning algorithm to detect and catalog hydroacoustic signals using Convolutional Neural Network
- Analyze and catalog subduction zone seismicity near the Aleutian islands using continuous hydroacoustic data
- Study tidal correlation of seismicity along the mid-ocean ridge transform faults
- Detect submarine landslides happening in canyon channels by spectral analysis of hydrophone data
- Study eruptive accretion along South East Pacific Rise using magnetometer and bathymetry data collected by AUV *Sentry*

Hydroacoustic Observations along Indian Ocean Spreading Ridges (Ph.D. Thesis) *Brest, France*

Organization: Lab Geo-Ocean, University of Brest, CNRS and IFREMER *October 2020 - October 2023*

- Detect and catalog microearthquakes along mid-ocean ridges in Indian Ocean using long-term continuous hydroacoustic data
- Study their magmatic or tectonic origin from spatiotemporal distribution and their association with different tectonic settings

Moho Transition Zone: Synthetic Modelling Study (Geophysical Engineer) *Paris, France*

Organization: Marine Geo-sciences Lab, IPGP *October 2019 - August 2020*

- Model synthetic seismograms of oceanic lower crust and Moho discontinuity using finite difference solution
- Propose a design of a seismic survey experiment to investigate the nature of oceanic Moho discontinuity

Detection of seismic events using Template Matching Method (Master's Thesis II) *Paris, France*

Organization: Seismology Lab, IPGP *February 2019 - June 2019*

- Detect and catalog foreshocks and aftershocks of 2013 Okhotsk Deep Sea earthquake (Mw 8.3) by template matching method
- Improve regional earthquake catalog to investigate the time-space evolution of the seismicity before and after the mainshcok

Ambient Noise Seismic Tomography (Master's Thesis I) *Pune, India*

Organization: IISER Pune *October 2017 - August 2018*

- Perform seismic interferometry of ambient noise followed by local travel time tomography using the Fast Marching Method
- Obtain a velocity model and studied geological properties of shallow earth's crust beneath the Southern India peninsula

Open Source Data

1. **Ingale, V. V.** , Fan, W., Parnell-Turner, R. (2025). Microseismicity catalogs of Quebrada-Discovery-Gofar transform faults. [Data set]. *Zenodo*.(Link).
2. **Ingale, V. V.** (2025). Hydroacoustic Catalog Processing Toolkit: V0.1 [Software]. *Zenodo*.(Link).
3. **Ingale, V. V.**, Tepp, G., Dziak, R. P. and Parnell-Turner, R. (2025). Hydroacoustic catalog along the Aleutian arc in 2022-2023 [Data set]. *Zenodo*.(Link).
4. **Ingale, V. V.**, Bazin, S., and Royer, J.-Y. (2024). Hydroacoustic catalogs along the Southwest Indian Ridge between 2016 and 2018. *SEANOE*. (Link).

Invited Talks

1. May 2025: *Hydroacoustic detections of underwater geohazards* at University of Brest, France
2. April 2025: *Hydroacoustic monitoring of submarine Geohazards* at IGPP-SIO, USA
3. March 2025: *Environmental Ocean Acoustics* at CalTech, USA
4. May 2024: *Post-doc Enigma:Research, Grants & not losing your mind* at Indian Diaspora Network
5. January 2024: *My Ph.D. Jounrney: Science and Beyond* at IISER Pune, India
6. June 2022: *A Campaign to Southern Indian Ocean* at University of Brest, France

Outreach and Media

1. Featured in SIO's News article on first ever hydroacoustic detection of lanslides (Link)
2. Featured in Seismological Research Letter's News article on hydroacoustic detection of lanslides (Link)
3. Interactive session on my Ph.D. journey and beyond (Link)