Yuchen Bai — PhD Candidate

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https://naian.github.io/

Education

Inira (Statify), Grenoble Alpes University — Grenoble, France
Ph.D. in Statistic — 2021 - 2024 *(expected)*
- Advisor: Jean-Baptiste Durand
- Co-advisor: Grégoire Vincent, Florence Forbes
- Research area: Machine Learning, LiDAR, Remote Sensing, Forest

Information Technology Research Unit, Université Paris Cité — Paris, France
Master in Data Processing and Analysis — 2019 - 2021

Information Technology and Mathematics Training and Research Unit, Université Paris Cité — Paris, France
Dual bachelor's degree in Mathematics and Computer Science — 2017 - 2019

Publications

1. **Bai, Y.** (2024). Simulation and machine learning models for bias assessment and reduction in leaf area density estimators in tropical forests. *PhD dissertation.*

2. **Bai, Y.**, Verley, P., Tiangang, Y., Nicolas, L., Forbes, F., Durand, J.-B., & Vincent, G. (2024). Assessing leaf versus plant area index in evergreen forests through UAV laser scanning: A simulation study. *Submitted for publication.*

3. Badouarda, V., Verley, P., **Bai, Y.**, Sellan, G., Françoise, L., Marcon, E., Derroire, G. & Vincent, G. (2024). Using high penetration airborne LiDAR and dense UAV scanning to produce accurate 3D maps of light availability in dense tropical forest. *In preparation.*

4. **Bai, Y.**, Durand, J.B., Vincent, G., Forbes, F., 2023. Semantic segmentation of sparse irregular point clouds for leaf/wood discrimination. In: Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S. (Eds.), Processing of the Conference on Neural Information Processing Systems (NeurIPS 2023). 37, New Orleans, USA, 10-16 December 2023. Curran Associates, Inc. pp. 48293–48313.

Conference

TRIDIFOR 2024 | Oral | Online — 2024.11.26 - 2024.11.28
- *TRIDIFOR – Méthodes innovantes d'analyse de données 3D en forêt*
- Topic: Evaluation of Leaf Area Index (LAI) Using Simulated ULS data

JdS 2024 | Oral | Bordeaux, France — 2024.05.27 - 2024.05.31
- *55th 'Journées de Statistique'*
- Topic: Semantic segmentation of forest point clouds using neural network

NeurIPS 2023 | Poster | New Orleans, USA — 2023.12.10 - 2023.12.16
- *Thirty-seventh Conference on Neural Information Processing Systems*
- Topic: Semantic segmentation of sparse irregular point clouds for leaf/wood discrimination

CEBA 2023 | Oral | Cayenne, French Guiana — 2023.10.11 - 2023.10.12
- *Annual conference on Centre d'Etude de la Biodiversité Amazonienne*
- Topic: Bayesian models for spatial dependencies and neural networks for leaf / wood discrimination in LiDAR leaf area density estimation

SilviLaser 2023 | Oral | London, UK — 2023.09.06 - 2023.09.08
- *18th conference on applications of laser systems for forest assessment and inventory*
- Topic: Leaf/wood discrimination in point cloud data using neural network

TRIDIFOR 2022 | Oral | Online — 2022.09.20 - 2022.09.22
- *TRIDIFOR – Méthodes innovantes d'analyse de données 3D en forêt*
- Topic: Leaf/wood discrimination in point cloud data using neural network

RESEARCH EXPERIENCE	**Data collection in tropical forest** | Paracou, French Guiana 2023.10.12 - 2023.10.28

RESEARCH EXPERIENCE

Data collection in tropical forest | Paracou, French Guiana   2023.10.12 - 2023.10.28
- Collecting LiDAR data (UAV) and measuring canopy profiles and Diameter at Breast Height (DBH)

TEACHING

INF101 | Université Grenoble Alpes   2022.09.06 - 2023.02.25
- Computer methods and programming techniques (For 1st Year)

SKILLS

Simulating LiDAR Data: Experienced in using DART (Discrete Anisotropic Radiative Transfer) model to simulate LiDAR processes on mock-ups and generate point cloud data, particularly skilled in simulating forest mock-ups. DART is a universal 3D radiative transfer model for simulating remote sensing signals by modelling light propagation in 3D landscape.

Point cloud semantic segmentation: Developed and continuously maintain a deep learning model, SOUL, dedicated to UAV laser scanning LiDAR data leaf/wood segmentation.

Deriving leaf area from LiDAR data: Using AMAPVox model to derive the leaf area index from LiDAR data in voxel level, or other related parameters such as wood surface, wood volume, vegetation volume, etc. AMAPVox is able to track every laser pulse through 3D grid (voxelized space) and computes the local transmittance or local attenuation per voxel.

REFERENCES

Florence FORBES | Senior Researcher (Director of Research)
- florence.forbes@inria.fr
- Head of team Statify (previously Mistis), Inria Center of University Grenoble Alpes (G210)
- Cofounder and Scientific Advisor of Pixyl Automatic Neuroimaging Solutions https://pixyl.ai/
- Inria Center of University Grenoble Alpes 655, avenue de l'Europe, Montbonnot, 38334 Saint Ismier Cedex, France
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- http://mistis.inrialpes.fr/people/forbes/

Grégoire VINCENT | Habilitation for directing reseach (HDR)
- gregoire.vincent@ird.fr
- Co-chair of the remote sensing group in AMAP Lab
- Parc Scientifique Agropolis, 2196 Bd de la Lironde, 34980 Montferrier-sur-Lez, France
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Jean-Baptiste DURAND | Habilitation for directing reseach (HDR)
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- Co-chair of Digital Plants research group in AMAP Lab
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