# Titouan **Le Gourrierec**

VISITING STUDENT RESEARCHER · KAIST MRI LAB

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## Experience

### KAIST (Korea Advanced Institute of Science and Technology)

*Daejeon, South Korea*

VISITING STUDENT RESEARCHER — *Sep. 2025 - Present*

Physics-guided neural networks for Blood-Brain Barrier permeability estimation using Diffusion-Weighted Arterial Spin Labeling (DW-ASL).
Supervised by Prof. Sung-Hong Park at KAIST MRI Laboratory.

- Developed two physics-guided architectures: (i) MLP with simulation-based pre-training and patient-specific adaptation, and (ii) 3D U-Net with patient-specific fine-tuning.
- Integrated a forward biophysical signal model into the loss function to enforce physiological consistency.
- Outperformed NLS and ADMM optimization methods on PSNR, RMSE, and SSIM metrics.
- Validated on 16 in-vivo subjects, revealing prolonged transit times and reduced BBB water exchange in elderly subjects.
- Published in *NeuroImage*.

### EDI (Institute of Electronics and Computer Science)

*Riga, Latvia*

RESEARCH ASSISTANT — *May 2024 - Aug. 2024*

Reinforcement learning for robotic manipulation using custom virtual environments and state-of-the-art algorithms.
Supervised by Dr. Roberts Kadiķis at Robotics and Machine Perception Laboratory.

- Developed custom virtual environments for reinforcement learning on a UR5e robot with a Robotiq 140 gripper using MuJoCo and Isaac Lab.
- Forked the OpenAI Gym library to integrate the custom environment, enabling compatibility with RL frameworks such as StableBaselines.
- Designed and implemented a pick-and-place task, training and evaluating deep RL models based on PPO, DDPG, and SAC algorithms.

### INRAE

*Montpellier, France*

RESEARCH ASSISTANT — *Jan. 2024 - May 2024*

Machine learning for detection and segmentation of foliar diseases on wheat leaves.
Supervised by Prof. Baptiste Magnier (Research Professor at IMT Mines Alès) and Clément Plessis (PhD student at INRAE).

- Developed a specialized tool for automated analysis of foliar disease symptoms on wheat leaves.
- Processed and analyzed over 8,000 wheat leaf images, enabling large-scale phenotyping.

## Education

### KAIST (Korea Advanced Institute of Science and Technology)

*Daejeon, South Korea*

ACADEMIC EXCHANGE — *Feb. 2025 - Jun. 2025*

- Relevant Modules: Artificial Intelligence & Machine Learning, Data Science Methodology, Biostatistics, Genome Bioinformatics.

### IMT Mines Alès

*Alès, France*

MSc COMPUTER SCIENCE & ARTIFICIAL INTELLIGENCE (DIPLÔME D'INGÉNIEUR) — *Sep. 2022 - Jun. 2026*

- Relevant Modules: Advanced Probabilities & Statistics, Algorithms & Complexity, Machine Learning & Deep Learning, Software Engineering.

### Lycée Henri Loritz

*Nancy, France*

SCIENTIFIC PREPARATORY CLASSES (PCSI—PSI*) — *Sep. 2020 - Sep. 2022*

- Two-year intensive program in maths, physics, and computer science, preparing for national competitive exams for top engineering schools.

## Skills

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| **Languages** | French (Native), English (Fluent, TOEFL iBT 100/120), Korean (Beginner) |
| **Programming Languages** | Python, C, R |
| **ML Frameworks** | PyTorch, TensorFlow, Scikit-learn, NumPy, Pandas, SciPy, OpenCV |
| **DevOps & Tools** | Git, GitHub, CI/CD, Weights & Biases |

## Publications

[1] Ahn, Hyun-Seo*, **Titouan Le Gourrierec***, Yujin Jung*, Seonghyuk Kim, Seon-ha Hwang, Jaeseok Park, Dong Young Lee, C.-H. Sohn and Sung-Hong Park (*Equal contribution). "Estimating blood-brain barrier exchange rate using diffusion-weighted arterial spin labeling and physics-guided neural networks." NeuroImage (2026): 122132.

[2] **Le Gourrierec, Titouan***, Axel Prouvost*, Léna Connesson*, Hélène Fréville, Baptiste Magnier and Clément Plessis (*Equal contribution). "Easy to use and low cost leaf disease quantification workflow using Ilastik." [TO BE SUBMITTED]

## Software

**elevatr** — 19,000+ downloads

A Python package to simplify downloading and processing elevation data.

*titouanlegourrierec/elevatr*

**easilastik** — 8,000+ downloads

Easy integration of Ilastik segmentation models in Python.

*titouanlegourrierec/easilastik*

## Scholarships & Grants

2025 **International Mobility Scholarship (€1,050)**, Région Occitanie, France

2025 **Alumni Scholarship (€600)**, Mines Alès Alumni

2024 **Erasmus+ Traineeship Mobility Grant (€1,600)**, European Union – Erasmus+ Programme

2024 **International Mobility Scholarship (€975)**, Région Occitanie, France

## Academic Service

2026 **Reviewer**, Investigative Magnetic Resonance Imaging Journal — *South Korea*