Thomas COUDERT

Doctor of Physics

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RESEARCH EXPERIENCE

2025-now **Postdoctoral Scholar, UCLA, California**

2021-2024 **PhD in Physic for Life Sciences, Grenoble Institute Neurosciences (GIN), France**
MRI « fingerprinting » and Artificial Intelligence for the management of acute stroke patients.

2021 **Master Internship, Grenoble Institute Neurosciences (GIN), France**
Segmentation of brain tumors from MRI in patients with glioblastoma.

2020/2021 **Deep learning and machine learning project with CEA Grenoble, France**
Development of a predictive model of J.H. Conway's Game of Life for biomedical purposes.

PROFESSIONAL EXPERIENCE

2024 **Research Engineer**
MR simulations and MRI reconstructions framework developments.

2021 **Master Internship Pixyl Medical**
Participation in the R&D development of the start-up Pixyl Medical. Deep-learning-based segmentation of Multiple Sclerosis Lesion in brain MRI.

2019-2020 **Student ambassador Grenoble-INP Emblem**
Representative of the Emblem Grenoble brand within the Grenoble-INP network: communication, sales, promotion, and management of the ambassador team.

EDUCATION

2021-2024 **PhD in Physic for Life Sciences, Grenoble Institute Neurosciences (GIN)**
MRI « fingerprinting » and Artificial Intelligence for the management of acute stroke patients.

2018-2021 **Master in Engineering at Grenoble-INP Phelma school**
3rd year: Biomedical Imaging.
2nd year: Biomedical Engineering.
1st year: Physic Electronic Telecom.

2020 **Machine Learning and Deep Learning formations**
Andrew Ng lecture, Stanford (Coursera Certifications)
Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization
Structuring Machine Learning Projects
Neural Networks and Deep Learning

2016-2018 **Preparatory Classe at La Prépa Des INP Grenoble**
Two years of intensive scientific courses to prepare at Engineering School.

TEACHING EXPERIENCE

2024 **3 months Internship supervision**
Master 1 Student in Biomedical Engineering
Project: *Automated optimisation of MR vascular Fingerprinting bSSFP sequences.*

2022 **Course: Introduction to Python**
Grenoble National Polytechnic Institute - Preparatory class.

2022 **Practical class supervision: Introduction to PCR method**
Grenoble National Polytechnic Institute - Preparatory class.

2022 **Practical session animation - Synthetic MRI Contrast Generation**
AI4Health Winter School - January 14th, 2022

PUBLICATIONS

1. Thomas Coudert, Maitê Silva Martins Marcal, Aurélien Delphin, Antoine Barrier, Lila Cunge, Loïc Legris, Jan M. Warnking, Benjamin Lemasson, Emmanuel L. Barbier, Thomas Christen (2025). *Fast MR signal simulations of microvascular and diffusion contributions using histogram-based approximation and Recurrent Neural Network.* Magn Reson Med. https://doi.org/10.1002/mrm.30629
2. Thomas Coudert, Aurélien Delphin, Antoine Barrier, Emmanuel L. Barbier, Benjamin Lemasson, Jan M. Warnking, Thomas Christen (2025). *MR Fingerprinting for Imaging Brain Hemodynamics and Oxygenation.* J Magn Reson Imaging. https://doi.org/10.1002/jmri.29812
3. Thomas Coudert, Aurélien Delphin, Antoine Barrier, Loïc Legris, Jan M. Warnking, Laurent Lamalle, Mariya Doneva, Benjamin Lemasson, Emmanuel L. Barbier, Thomas Christen (2025). *Relaxometry and contrast-free cerebral microvascular quantification using balanced Steady-State Free Precession MR Fingerprinting.* Magn Reson Med. 2025;1-15. https://doi.org/10.1002/mrm.30434
4. Aurélien Delphin, Fabien Boux, Clément Brossard, Thomas Coudert, Jan M Warnking, Benjamin Lemasson, Emmanuel Luc Barbier, Thomas Christen (2024). *Enhancing MR vascular Fingerprinting through realistic microvascular geometries*. Imaging Neuroscience 2024; 2 1-13 https://doi.org/10.1162/imag_a_00377
5. Thomas Coudert*, Antoine Barrier*, Aurélien Delphin, Benjamin Lemasson, Thomas Christen (2024). *MARVEL: MR Fingerprinting with Additional micRoVascular Estimates using Bidirectional LSTMs.* Medical Image Computing and Computer Assisted Intervention – MICCAI 2024. Lecture Notes in Computer Science, vol 15002. Springer, Cham. https://doi.org/10.1007/978-3-031-72069-7_25
6. Geoffroy Oudoumanessah, Thomas Coudert, Carole Lartizien, Michel Dojat, Thomas Christen, Florence Forbes (2024). *Scalable magnetic resonance fingerprinting: Incremental inference of high dimensional elliptical mixtures from large data volumes.* **Under review**
7. Loïc Legris, Thomas Coudert, Aurélien Delphin, Thomas Christen, Emmanuel L. Barbier, Olivier Detante (2025). *Brain synthetic MRI: A scoping review.* **In-preparation**

AWARDS

- ISMRM 2025 Summa Cum Laude Merit Award (Co-primary author)
- ISMRM 2025 Magna Cum Laude Merit Award (Author)

CONFERENCE PAPERS

1. Maitê Marcal, Thomas Coudert, Aurélien Delphin, Antoine Barrier, Emmanuel L. Barbier, Benjamin Lemasson, Thomas Christen. *Advanced MR vascular Fingerprinting.* **ISMRM 2025 Honolulu (Oral)**
2. Thomas Coudert, Aurélien Delphin, Maitê Marcal, Antoine Barrier, Benjamin Lemasson, Emmanuel L. Barbier, Thomas Christen. *MR-WAVES: MR simulations from 3D realistic microvascular networks in a few seconds.* **ISMRM 2025 Honolulu (Poster)**

3. Antoine Barrier, Thomas Coudert, Aurélien Delphin, Loïc Legris, Geoffroy Oudoumanessah, Laurent Lamalle, Florence Forbes, Mariya Doneva, Benjamin Lemasson, Emmanuel L. Barbier, Thomas Christen. *MARVEL MRF for Contrast-free Blood Volume, Microvascular Properties, and Relaxometry mapping: initial tests in volunteers and stroke patients.* **ISMRM 2025 Honolulu (Power Pitch Oral)**
4. Geoffroy Oudoumanessah, Thomas Coudert, Antoine Barrier, Aurélien Delphin, Carole Laritzien, Michel Dojat, Emmanuel L. Barbier, Thomas Christen, Florence Forbes. *Robust Subspace Clustering Approach for High-Dimensional MRF: Novel Simultaneous Clustering and Dimensionality Reduction at Scale.* **ISMRM 2025 Honolulu (Poster)**
5. Lucie Chalet, Sébastien Rigollet, Vasile Stupar, Aurélien Delphin, Thomas Coudert, Benjamin Lemasson, Emmanuel L. Barbier, Laura Mechtouff, Timothé Boutelier, Emmanuelle Canet-Soulas, Thomas Christen. *Estimating blood oxygen saturation through susceptibility sources separation: a new standpoint on quantitative BOLD models*. **ISMRM 2025 Honolulu (Power Pitch Oral)**
6. Geoffroy Oudoumanessah, Thomas Coudert, Luc Meyer, Aurélien Delphin, Thomas Christen, Michel Dojat, Carole Lartizien, Florence Forbes, *Cluster Globally, Reduce Locally: Scalable Efficient Dictionary Compression for Magnetic Resonance Fingerprinting.* **2025 IEEE ISBI**
7. Antoine Barrier, Lila Cunge, Thomas Coudert, Aurélien Delphin, Loïc Legris, Laurent Lamalle, Emmanuel L. Barbier, Benjamin Lemasson, Thomas Christen, *IRM Fingerprint vasculaire sans agent de contraste : impact du sous-échantillonnage spatial.* **SFRMBM 2025 (Oral)**
8. Maitê Marçal, Thomas Coudert, Aurélien Delphin, Antoine Barrier, Emmanuel L. Barbier, Benjamin Lemasson et Thomas Christen, *Nouveaux développements sur l'IRM fingerprinting vasculaire.* **SFRMBM 2025 (Oral)**
9. Thomas Coudert, Aurélien Delphin, Loïc Legris, Antoine Barrier, Jan M. Warnking, David Chechin, Laurent Lamalle, Peter Mazurkewitz, Peter Koken, Emmanuel L. Barbier, Mariya Doneva, Thomas Christen (2024). *Contrast-free Blood Volume, Microvascular Properties and Relaxometry mapping using bSSFP MR Fingerprinting*. **ISMRM 2024 Singapore** (**Power Pitch Oral**)
10. Liliane Daniela Talba Malla Tchamedeu, Benjamin Lambert, Thomas Coudert, Elizabeth Moyal Cohen-Jonathan, Soléakhéna Ken, Géraldine Le Duc, Michel Dojat, Fabien Boux, Benjamin Lemasson (2024). *Segmentation d'IRM multimodales par réseaux de neurones : Stratégies de transfert d'apprentissage pour des ensembles de données de taille limitée.* **IABM24 Grenoble** (**Poster**)
11. Antoine Barrier, Thomas Coudert, Aurélien Delphin, Loïc Legris, Jan Warnking, Emmanuel Barbier, Thomas Christen (2024). *Reconstructions de cartes multi-paramétriques haute dimension accélérées via LSTM bidirectionnel et IRM Fingerprint.* **IABM24 Grenoble** (**Poster**)
12. Aurélien Delphin, Thomas Coudert, Audrey Fan, Michael E Moseley, Greg Zaharchuk, Thomas Christen (2023). *MR Vascular Fingerprinting with 3D realistic blood vessel structures and machine learning to assess oxygenation changes in human volunteers*. **ISMRM 2023 Toronto** (**Poster**)
13. Thomas Coudert, Aurélien Delphin, Jan M.Warnking, Emmanuel L.Barbier, Thomas Christen (2023). *Utilisation de séquences de type MR Fingerprint bSSFP pour les mesures T2* et la quantification de l'effet BOLD*. **SFRMBM 2023** (**Poster**)
14. Thomas Coudert, Aurélien Delphin, Jan M.Warnking, Emmanuel L.Barbier, Thomas Christen (2023). *Réseaux de neurones profonds pour la simulation de signaux IRM pour l'IRM Fingerprint vasculaire.* **IABM23 Paris** (**Poster**)
15. Thomas Coudert, Aurelien Delphin, Jan Warnking, Benjamin Lemasson, Emmanuel L Barbier, Thomas Christen (2022). *Searching for an MR Fingerprinting sequence to measure brain oxygenation without contrast agent*. **ISMRM 2022 London** (**Poster**)
16. Thomas Coudert, Sophie Ancelet, Nadya Pyatigorskaya, Lucia Nichelli, Damien Ricard, Dimitri Psimaras, Marie Odile Bernier, Michel Dojat, Florence Forbes, Alan Tucholka (2021). *Contribution of Transfer Learning for automatic segmentation of radiation-induced brain lesions in glioblastoma patients from a limited number of annotated MRI*s. **GDR Statistique&Santé** (**Oral**)