Cécilia Tarpau

24 years old - PhD Student

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3rd year PhD student at CY Cergy Paris University

Title: A new modality of Compton scattering tomography: concept, modelling and associated inverse problems

Supervised by :
Prof. Mai K. Nguyen, ETIS (CY Cergy Paris Université, ENSEA, CNRS UMR 8051)
Prof Laurent Dumas, LMV (Université Versailles Saint Quentin, CNRS UMR 8100)
Dr. Geneviève Rollet, LPTM (CY Cergy Paris Université, CNRS UMR 8089)

Teaching: Signal, Image and Video processing *(Bachelor, 40 hours, Master, 16 hours)*, Classical mechanics *(Bachelor, 52 hours)* and Transport phenomena *(Bachelor, 13 hours)*.

50% supervision of a Master research project entitled *Aid to diabetic diagnosis by retinal analysis*

Education

Academic

Research master in Signal processing and Telecommunications - With first-class honors — *Cergy, France*
CY Cergy Paris University — *October 2017 - September 2018*

- **Head of the class** (29 students)

Engineering degree in electronics, IT, telecommunications and embedded systems — *Cergy, France*
Ecole Nationale Supérieure de l'Électronique et de ses Applications — *September 2015 - September 2018*

- Third year: Specialization in Signal, Audio, Image and Video processing - **Head of the class** (Rank: 1/16 students)
  Ionospheric interference compensation on SAR interferograms (with IPGP (UMR 7154))
- Second year : **Head of the class** (Rank : 1/224 students)
- First year: (Rank:3/186)

Preparatory class to French "grandes écoles" in mathematics, physics and computer science — *Fort-de-France, Martinique*
Lycée Bellevue — *September 2013 - June 2015*

High school diploma in sciences - equivalent to A levels - with honors — *Rivière Salée, Martinique*
Lycée Joseph Zobel — *June 2013*

In-class training and E-learning

2020	**Training in Machine Learning**, by Prof. Rudolf A. Roemer (Warwick University, Angleterre)	*Cergy, France*
2019	**Se former pour enseigner dans le supérieur (Training to teach in higher education)**, by the French Ministry of Higher Education, Research and Innovation	*Online, Fun MOOC*
2019	**Fundamentals of Biomedical Imaging: Ultrasounds, X-ray, Positron Emission Tomography (PET) and applications**, by Ecole Polytechnique Fédérale de Lausanne	*Online, edX*
2015	**The Arduino Platform and C programming**, by the University of California, Irvine	*Online, Coursera*
2015	**Interfacing with the Arduino**, by the University of California, Irvine	*Online, Coursera*
2015	**The Raspberry Pi and Python Programming for Rasp. Pi**, by the University of California, Irvine	*Online, Coursera*

Professional experiences

Master Research project - Third year engineer Internship — *Cergy, France*
ETIS Lab - Equipes Traitement de l'information et Systèmes (UMR 8051), Supervised by Prof. Mai K. Nguyen — *April - September 2018*

- Research subject: New modality of Compton Scattering Tomography
- Results presented at two international conferences (IPCV'2018 et IEEE NSS-MIC'2018)

Second year engineer internship — *Newcastle, Angleterre*
Northumbria University, supervised by Prof. Krishna Busawon — *June - August 2017*

- Time series prediction using Recurrent Neural Networks
- Extension of decomposition methods from unbalanced three-phase systems to n-phase systems

First year engineer internship — *Bellefontontaine, Martinique*

Electricité de France — *June - August 2016*

- Integration of the project team working on energy transition
- MADIN'DRIVE project: implementation of electric vehicles in Martinique
  Study of the interest of setting up a three-phase system instead of the single-phase system of the existing shade-house
  Elaboration of a business model: Research of technical solutions for the development of a network of shade-houses in Martinique.
- SOLARICE project: experimentation of solar air conditioning in Martinique

Distinctions and awards

2018	**Distinction for academic excellence,** for my studies at ENSEA	*Cergy, France*
2018	**Half thesis scholarship,** LabEx Modèles Mathématiques et Économiques de la Dynamique, de l'Incertitude et des Interactions (MME-DII)	*France*
2018	**Half thesis scholarship,** Domaine d'Innovation Majeur (DIM) Mathématiques Innovation	*France*

Scientific publications

Peer-reviewed articles from international scientific journals

[1] Cécilia Tarpau, Javier Cebeiro, Mai K. Nguyen, Geneviève Rollet and Marcela A. Morvidone "Analytic inversion of a Radon transform on double circular arcs with applications in Compton Scattering Tomography", *IEEE Transactions on Computational Imaging (IEEE-TCI)*, vol. 6, pp. 958-967, 2020. [doi:10.1109/TCI.2020.2999672].

[2] Cécilia Tarpau and Mai K. Nguyen, "Compton scattering imaging system with two scanning configurations", *Journal of Electronic Imaging (JEI)*, vol. 29, no. 1, January, 2020. [doi: 10.1117/1.JEI.29.1.013005].

[3] Cécilia Tarpau, Javier Cebeiro, Marcela A. Morvidone and Mai K. Nguyen, "A new concept of Compton scattering tomography and the development of the corresponding circular Radon transform", *IEEE Transactions on Radiation and Plasma Medical Sciences (IEEE-TRPMS)*, vol. 4, no. 4, pp. 433-440, July 2020. [doi:10.1109/TRPMS.2019.2943555].

Papers from international peer-reviewed conferences

[1] Cécilia Tarpau, Javier Cebeiro, Mai K. Nguyen, Geneviève Rollet and Laurent Dumas "A 3D imaging system based on scattered ionizing radiation", *International Conference of SPIE Photonics Europe*, Strasbourg, France, by visioconference from 6 to 10 April 2020.

[2] Cécilia Tarpau, Javier Cebeiro, Mai K. Nguyen, "A new bi-imaging NDT system for simultaneous recovery of attenuation and electronic density maps", *11th Symposium on NDT in Aerospace*, Paris, France, 13-15 November 2019.

[3] Javier Cebeiro, Marcela A. Morvidone, Diana Rubio, **Cécilia Tarpau** and Mai K. Nguyen, "A new Transmission Compton Scattering Tomography", *XVIII Workshop on Information Processing and Control (RPIC)* Bahía Blanca, Argentine, 18-20 September 2019. [doi:10.1109/RPIC.2019.8882134]

[4] Cécilia Tarpau and Mai K. Nguyen, "Scattering imaging system with dual configuration", *14th International conference on Quality Control by Artificial Vision (QCAV)*, Mulhouse, France, 15-17 May 2019. [doi: 10.1117/12.2522168]

[5] Javier Cebeiro, Marcela A. Morvidone, **Cécilia Tarpau** and Mai K. Nguyen, "On the invertibility of a new toric Radon transform with applications in Compton scatter tomography", *VII Congress on Industrial, Computational and Applied Mathematics (MACI)*, Comodoro Rivadavia, Argentine, 8-10 May 2019. [ISSN: 2314-3282]

[6] Javier Cebeiro, Mai K. Nguyen, Marcela Morvidone and **Cécilia Tarpau**, "An interior Compton Scattering Tomography", *25th IEEE Nuclear Science Symposium and Medical Imaging Conference (IEEE NSS/MIC)*, Sydney, Australia, 10-17 November 2018. [doi:10.1109/NSSMIC.2018.8824374]

[7] Cécilia Tarpau and Mai K. Nguyen, "A novel modality of Compton Scattering Tomography: Image formation and Reconstruction", *22th International Conference on Image Processing, Computer Vision and Pattern Recognition (IPCV)*, Las Vegas, Etats Unis, 30 July - 2 August 2018. [ISBN:1-60132-485-5]

Invited presentations at international conferences

[1] Cécilia Tarpau, Javier Cebeiro and Mai K. Nguyen, "Radon transforms on circular arcs and their associated modalities of Compton Scattering Tomography", *10th International Conference on Applied Inverse Problems (AIP)*, Grenoble, France, July 8-12 2019.

[2] Javier Cebeiro, **Cécilia Tarpau**, Marcela A. Morvidone, Diana Rubio and Mai K. Nguyen, "A new Toric Radon transform and its connection with other Radon type transforms", *10th International Conference on Applied Inverse Problems (AIP)*, Grenoble, France, July 8-12 2019.

Associative experiences

2019	**Participation in Explorascience,** Science popularization day for college students	*Cergy, France*
2017	**Participation in Bouge la Science,** Science popularization day for college students	*Cergy, France*
2016	**Volonteer at AFEV,** Accompaniment of a college student during a school year	*Cergy, France*