Marco Freire

Curriculum Vitae

✱ *Born on May 14, 1998 in Madrid (Spain)*
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Education

2024 **PhD in Computer Science**, *Université de Lorraine*, Nancy
2020 **Magistère Computer Science**, *École Normale Supérieure de Rennes*, Nancy
2020 **Master's in Computer Science**, *Université de Rennes 1*, Nancy
2018 **Bachelor's in Computer Science**, *Université de Rennes 1 / ENS Rennes*, Nancy

PhD thesis

Title *Problèmes d'agencement sous contraintes topologiques pour la fabrication computationnelle*
Field Computer Science
Dates Started 2020–10–01, defended 2024–07–11
Laboratory LORIA, MFX team
Advisor Sylvain Lefebvre (Université de Lorraine, CNRS, Inria, LORIA)
Jury president Tamy Boubekeur (Adobe Research)
Reviewers Tamy Boubekeur (Adobe Research), Nobuyuki Umetani (University of Tokyo)
Examiner Mélina Skouras (Université Grenoble Alpes, Inria, CNRS, Grenoble INP, LJK)

Master's thesis

Memoir *Fast next-event estimation for reflection and refraction on triangles with interpolated normals*
Advisor Nicolas Holzschuch (Centre Inria de l'Université Grenoble Alpes, LJK)

Professional experience

Post-doctoral contracts

Research on *Field-Programmable Gate Array placement on GPU* following my thesis' work.

2024–10–01 à 2025–08–31 **Non-tenured teaching and research fellow**, *Université de Lorraine*, Nancy
Fixed-term contract, assigned to LORIA (MFX team).
176h of teaching at Faculté des Sciences et Technologies in Université de Lorraine.

2024–04–01 à 2024–09–30 **Engineer in Computer Science**, *CNRS*, Nancy
Fixed-term contract, assigned to LORIA (MFX team).

Contrats doctoraux

Research on *layout problems under topological constraints for computational fabrication*.

2024–01–01 à 2024–03–31 **Thesis extension**, *Inria*, Nancy
Fixed-term contract, assigned to LORIA (MFX team).

2023–10–01 à 2023–12–31 **Thesis extension**, *Université de Lorraine*, Nancy
Fixed-term contract, assigned to LORIA (MFX team).

2020–10–01 à 2023–09–30 **Doctoral student**, *Université de Lorraine*, Nancy
Fixed-term contract, assigned to LORIA (MFX team).
- 2020–2021: Teaching assistant at TELECOM Nancy (64h)
- 2021–2022: Teaching assistant at Faculté des Sciences et Technologies (64h)
- 2022–2023: Teaching assistant at École Nationale Supérieure des Mines de Nancy (64h)

Teaching activities

CM: lectures, TD: tutorial, TP: practical work, EI: mix of lecture and tutorial

2024–2025 **Non-tenured teaching and research fellow**, *Université de Lorraine*

Digital tools and culture
- L1 Bioscience, 10h TP, 15–20 students
- L1 Science for Engineering, 8h TP, 15–20 students
- L1 Computer Science, 8h TP, 15–20 students

Programming project (L1 Computer Science) 20h EI, 30–35 students
Programming project (L2 Computer Science) 44h TP + 4h EI, 15–20 students
Combinatorial optimization (M1 Computer Science) 8h TP, 15–20 students

2024 **Higher Education Label**, *Université de Lorraine*

2022–2023 **Teaching assistant**, *Mines Nancy*

First year engineering students (equivalent to L3).
Programming and data structures 19.5h TD, 15–20 students
Algorithms and complexity 21h TD, 15–20 students
Operations research (in english) 19h TD, 15–20 students

2021–2022 **Teaching assistant**, *Université de Lorraine*

L1 in Computer Science students.
Design and programming methods 1 10h TP, 15–20 students
Algorithms and programming 2 40h TP + 1.25h EI, 15–20 students
Digital tools and culture 14h TP, 15–20 students

2020–2021 **Teaching assistant**, *TELECOM Nancy*

Second year engineering students (equivalent to M1). Some of these hours were done remotely due to the 2020 lockdowns.
Models and algorithms 50h TD, 20–25 students
Algorithms for parallel and distributed systems 14h TD, 20–25 students

Research activities

2024 ***Field-Programmable Gate Array* placement on GPU**, *LORIA, MFX team*

2023–2024 **Mesh unfolding for fabrication**, *LORIA, MFX team*

Collaboration with Silvia Sellán (MIT, USA; University of Toronto, Canada), Manas Bhargava and Bernd Bickel (IST Austria, Autriche). Resulted in a publication [1] in a peer-reviewed international journal (*Computer Graphics Forum*).

2021–2023 **Automatic design of foldable circuit boards for LED-based displays**, *LORIA, MFX team*

Collaboration with Manas Bhargava (IST Austria, Austria) et Bernd Bickel (IST Austria, Austria; ETH Zurich, Switzerland). Resulted in a publication [2] in a peer-reviewed international journal (*ACM Transactions on Graphics*) and a presentation at *SIGGRAPH 2023*, the associated international conference; where we also presented our fabricated objects during the *Bring your own Bunny (or something)*. Mentioned on Inria's website, and in articles from the french weekly magazines *L'Usine Nouvelle* and *La Semaine*. The implementation and data used for the publication are available online on `github`.

2020–2021 **Automatic generation of supports for 3D printing**, *LORIA, MFX team*

Resulted in a short publication [3] in the peer-reviewed international conference *Eurographics 2022*, where I also presented my work. I also presented my work at the national conference *French Days of Computer Graphics 2021*.

2018–2020 **Research internships in Computer Graphics**

Fast next-event estimation for reflection and refraction on triangles with interpolated normals (February 2020 to June 2020) at Inria Rhône-Alpes, supervised by Nicolas Holzschuch (MAVERICK team).

LTBench: an automatic benchmark for physically-based rendering (May 2019 to August 2019) at the Computer Graphics Group of the University of Prague, supervised by Jaroslav Křivánek, in collaboration with Vojtěch Tázlar.

Design of Novel Pseudo-Haptic Techniques for Tablets (May 2018 to August 2018) at Inria Rennes, supervised by Antoine Costes, Ferran Argelaguet and Anatole Lécuyer (HYBRID team).

Publications

[1] Manas Bhargava, Camille Schreck, Marco Freire, Pierre-Alexandre Hugron, Sylvain Lefebvre, Silvia Sellán, and Bernd Bickel. Mesh simplification for unfolding. *Computer Graphics Forum*, November 2024. 13 pages, https://doi.org/10.1111/cgf.15269.

[2] Marco Freire, Manas Bhargava, Camille Schreck, Pierre-Alexandre Hugron, Bernd Bickel, and Sylvain Lefebvre. PCBend: Light up your 3d shapes with foldable circuit boards. *ACM Trans. Graph.*, 42(4), July 2023. 16 pages, https://inria.hal.science/hal-04129354v1/document.

[3] Marco Freire, Samuel Hornus, Salim Perchy, and Sylvain Lefebvre. Procedural Bridges-and-pillars Support Generation. In *Eurographics 2022 - Short Papers*. The Eurographics Association, 2022. 4 pages, https://inria.hal.science/hal-04129354v1/document.

Languages

French, Spanish	Mother tongues
English	C1 level (TOEIC 2019)
German	A2 level