Ph.D Project EIPHI GS SELF-CONTROL

Job title	Phd thesis Research Position in computer science
Job type (PhD, Post-doc, Engineer)	PhD
Contract duration (months)	36 months
Qualifications (Master, Ph.D …)	Master
Employer	UBFC Université Bourgogne Franche-Comté
Financing Institutions	Région Bourgogne Franche-Comté & Graduate School EIPHI
Host Laboratory	FEMTO-ST institute DISC
URL Host Laboratory	https://www.femto-st.fr/fr/Departements-de-recherche/DISC/Presentation
Address Host Laboratory	1 cours Leprince Ringuet, 25200 Montbéliard
Job description	The definition of a construction process of an object composed of programmable matter is a very complex problem, involving the writing of distributed algorithms executed on each robot constituting this material. The subject we propose is to define algorithms and to evaluate them first on a behavioral simulator (VisibleSim) and then on real robots. These algorithms must allow a self-reconfiguration of the modules composing the material which considers various physical constraints. These constraints can be static (gravity, internal constraints) but also dynamic in a context of vibration of the structure. For example, if a bridge is to be built over a river, it is necessary to build counterweights to prevent the building from breaking or falling during its design. In addition, this structure may vibrate under the effects of an oscillator. The distributed self-reconfiguration algorithms proposed in this thesis must propose a reorganization of the modules composing the material to allow it to better resist these mechanical constraints.
Supervisor(s)	Benoit Piranda, MCF HDR benoit.piranda@femto-st.fr
Candidate profile	Master en Computer Sciences Informatique with experience and/or training in mechanical physics.
Keywords	Distributed algorithm, self-reconfiguration, mechanical constraints, programmable matter
Application deadline	01/06/2022
Application Depending on the type of position	Please send the following documents (all in one PDF file) by e-mail to benoit.piranda@femto-st.fr:

	1) For EU candidates: Copy of your national ID card or of your passport page where your photo is printed. For non-EU candidates: Copy of your passport page where your photo is printed. 2) Curriculum Vitae (may include hyperlinks to your ResearchID, Research Gate, Google Scholar accounts). 3) Detailed list of publications (may include hyperlinks to DOI of publications). 4) Letter of motivation relatively to the position (Cover Letter) in which applicants describe themselves and their contributions to previous research projects (maximum 2 pages) 5) Coordinates of reference persons (maximum 3): Title, Name, organization, e-mail. If you have questions regarding the application, you can contact the supervisor(s).