

Application BASTRI

Fiches Equipes

MOCQUA (SR0828JR)

Modèles de calcul émergents
CARTE (SR0731VR) □ MOCQUA

Statut: Décision signée

Responsable : Simon Perdrix

Mots-clés de "A - Thèmes de recherche en Sciences du numérique - 2024" : A2.3.2. Systèmes cyber-physiques , A2.4.1. Analyse , A6.5. Modélisation mathématique pour les sciences physiques , A7.1.4. Algorithmique quantique , A7.2. Logique , A7.3. Calculabilité et computabilité , A8.1. Mathématiques discrètes, combinatoire , A8.3. Géométrie, Topologie , A8.6. Théorie de l'information

Mots-clés de "B - Autres sciences et domaines d'application - 2024" : B9.5.1. Informatique , B9.5.2. Mathématiques , B9.5.3. Physique

Domaine : Algorithmique, programmation, logiciels et architectures
Thème : Preuves et vérification

Période : 01/01/2018 -> 31/12/2028

Dates d'évaluation :

Etablissement(s) de rattachement : U. DE LORRAINE, CNRS
Laboratoire(s) partenaire(s) : LORIA (UMR7503)

CRI : Centre Inria de l'Université de Lorraine
Localisation : Centre Inria de l'Université de Lorraine
Code structure Inria : 051109-0

Numéro RNSR : 201822770B
N° de structure Inria: SR0828JR

Présentation

The goal of the Mocqua team is to tackle challenges coming from the emergence of new or future computational models. The landscape of computational models has indeed changed drastically in the last few years: the complexity of digital systems is continually growing, which leads to the introduction of new paradigms, while new problems arise due to this larger scale (tolerance to faulty behaviors, asynchronicity) and constraints of the present world (energy limitations). In parallel, new models based on physical considerations have appeared. There is thus a real need to accompany these changes, and we intend to investigate these new models and try to solve their intrinsic problems by computational and algorithmic methods.

While the bit remains undeniably the building block of computer architecture and software, it is fundamental for the development of new paradigms to investigate computations and programs working with inputs that cannot be reduced to finite strings of 0's and 1's. Our team focuses on a few instances of this phenomenon: programs working with qubits (quantum computing), programs working with functions as inputs (higher-order computation) and programs working in infinite precision (real numbers, infinite sequences, streams, coinductive data, ...).

In the Mocqua team, we address problems that can lie at the interface with physics, biology, or mathematics. We employ tools and methods originating from computer science, that we sometimes enrich through these interdisciplinary interactions

Mocqua is structured around three models: Quantum Computing, Higher-Order Computing and Computing with infinite precision. The last term is arguably quite large in scope and will mostly stand here for dynamical systems.

While quantum computing and higher-order computing are decidedly different, it turns out that similar techniques can be used to answer their specific problems.

Axes de recherche

- Quantum Computing
- Higher-Order Computing

Contact

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En savoir plus

- Site de l'équipe
- Site sur inria.fr
- Site du responsable
- Derniers Rapports d'Activité : 2018 , 2019 , 2020 , 2021 , 2022 , 2023 , 2024

Documents sur la structure

- Intranet
- Privés

Décisions

- 12607 (04/01/2018) : création
- 13282 (20/12/2018) : prolongation
- 13735 (01/07/2019) : prolongation
- 14045 (16/12/2019) : prolongation
- 14160 (24/02/2020) : création
- 15226 (31/12/2021) : cessation du responsable
- 15227 (01/01/2022) : nomination responsable
- 16352 (12/07/2023) : modification
- 16660 (11/12/2023) : prolongation
- 16998 (26/04/2024) : prolongation
- 17520 (04/12/2024) : prolongation

Localisation

- **Adresse postale :** Centre Inria de l'Université de Lorraine, 615 rue du Jardin Botanique, 54600 Villers-lès-Nancy France
- **Coordonnées GPS :** 48.666, 6.157

- Infinite precision - Dynamical Systems.

Relations industrielles et internationales