Improving performance of BioDynaMo using ROOT C++ Modules

Alumni: Isaac Morales Santana
Mentors: Vassil Vassilev, Lukas Breitwieser, Tobias Duswald and Fons Rademakers
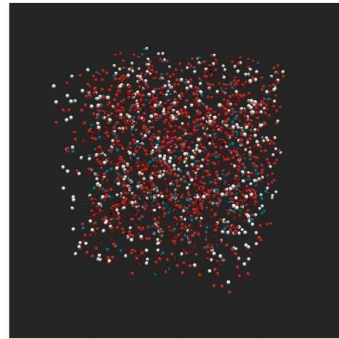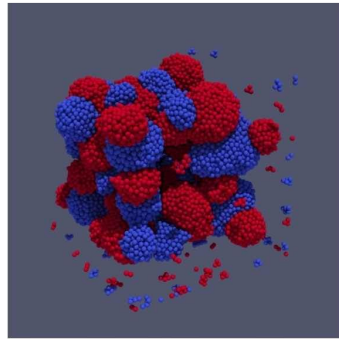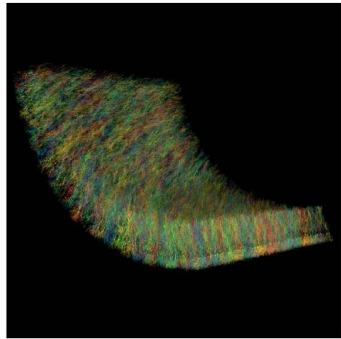
About me

Bachelor's Degree in Computer Engineering

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Member of Google Developer Student Clubs - Univ. of Granada.

What is BioDynamo?

Expected results

- Rework the **cmake** rules to incorporate efficiently ROOT via `FetchContent`
- Replace invocations of `genreflex` in favor of `rootcling`
- Enable C++ modules in `rootcling`
- Produce a comparison report

Week 1 (27/05-02/06)

Add check conditions in CPPFunctionNumbaType to identify cuda kernel calls.
Deliverable: Adding functionality

Week 2 (03/06-10/06)

Rework the CMake rules to incorporate efficiently ROOT via FetchContent. Deliverable:
External packages do not require curl or wget to integrate at cmake configuration time.

Week 3 (10/06-16/06)

Further exploration of ROOT's C++ module functionality. Improve documentation where necessary. (Finals week)

Week 4 (17/06-23/06)

(No activity due to finals week)

Weeks 5 and 6 (24/06-07/07)

Enable the C++ Modules in rootcling. Replace the indirection of invoking reflex from a script.

Weeks 7 and 8 (08/07-21/07) MID TERM EVAL.

Replace invocations of genreflex in favor of rootcling.

Week 9 (22/07-28/07)

Making further changes in the code to improve the functionality, exception handling, bug removal.

Week 10 (29/07-04/08)

Most of the time will be consumed for rigorous testing and bug fixes.

Week 11 (05/08-11/08)

Buffer Week

Weeks 12 and 13 (12/08-26/08) FINAL SUBM.

Extended testing, developing documentation, presenting the work. Deliverable: test cases, demonstrated reduction of the binary sizes, blog post about the achieved results; presentation at the compiler-research.org team meeting.