

# Working in Large Collaborations

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# Overview

- 1 What do I work on?
- 2 Advantages to collaborative programming
- 3 Problems with collaborative programming
- 4 Best practices
- 5 Conclusion

# SHERPA



- I have been part of SHERPA since Ph.D. (2010)
- ~10 people
- 4 different countries (3 Europe, 1 US)
- C++ code
- svn repository

What do I work on?

Advantages to collaborative programming

Problems with collaborative programming

Best practices

Conclusion

# Sherpa Collaboration



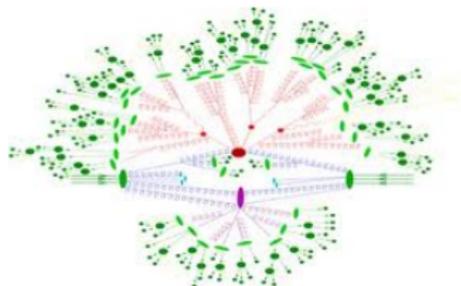
# SHERPA

- Modular code
  - Each physics point in a separate module
  - Easy use of different modules
  - Parallel development of several different features
- Sub-projects can be placed into branches

```
jennie@Cumin:~/Physics/Schools/computing2016/LargeCollaboration$ cd ~/rel-2-2-0/
jennie@Cumin:~/rel-2-2-0$ ls
actlocal.m4  AUTHORS  conple      config.status  depcomp      include      m4          METOOLS  PHOTONS++  stamp-h1
AddOns      auton4te.cache  config.guess  config.sub     DIRE          INSTALL      Makefile    missing   py-compile  svn.make
AHADIC++    BEAM        config.h     configure      Examples     install-sh   Makefile.in  MODEL     README
AMEGIC++    bin         config.h.in  configure.ac   EXTRA_XS    lib          Makefile.in  NEWS     share
AMISIC++    ChangeLog   config.h.in-  COPYING       GUIDELINES  libtool     Manual      PDF      SHERPA
ATOOLS      COMIX       config.log   CSSHOWER++    HADRONS++   ltmain.sh   M4CATNLO   PHASIC++  SHRLMPS
```

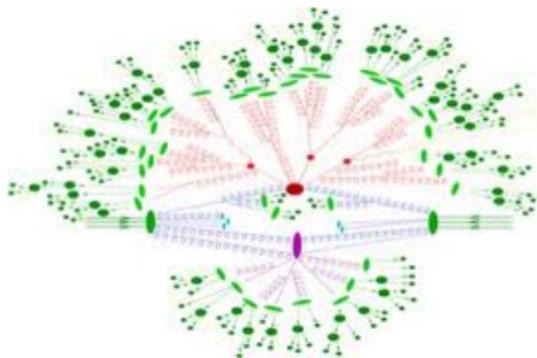
# What is SHERPA?

- General-purpose MC generator
- Connects theory and experiment
  - Perturbation theory
    - few (possibly coloured) final state particles
  - Experiment
    - many (colourless) particles as jets



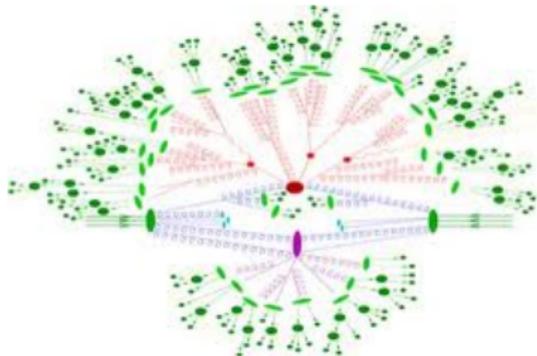
## Outline of an MC

- Hard process
- Shower
- Hadronisation
- Underlying event
- Decays of unstable particles/hadrons



## As a computing project

- Different physics must be implemented
- Needs to be flexible - different code for different processes
- Sometimes need to interface to external code
- Need input from several different people  
→ collaborative project



What do I work on?

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## Advantages to Collaborative Programming

## Working with other people

- Each part of the code is written by an expert in that feature (ideally)
- No one person has to understand the whole flow of the code (also a weakness)
- There is often an expert in the collaboration to ask if you have problems
- Speeds up production/coding time.
- Working in a collaboration should mean that everything you do is clear to other people.

## In SHERPA

- Aim for very modular structure.
- One person responsible for each module.
- Develop on independent branches
- Merging code (should) be easy because of the modular structure.

## Connections

- More pragmatically: increases connections you have for future career.
- Being an expert in a code can be useful for job applications.

## Main Advantage

### Personal opinion

Fast development (and parallel development) of code.

What do I work on?

Advantages to collaborative programming

**Problems with collaborative programming**

Best practices

Conclusion

## Problems with Collaborative Programming

## Having a large collaboration

- Lots of people to organise.
- Everyone has different commitments.
  - Teaching
  - Pheno projects (possibly related)
  - Grant applications
- Need to make sure everyone contributes.
- Communication is difficult.

## How do we tackle the problems in SHERPA?

- Communication is an ongoing problem.
- We have yearly meetings and e-mails for important changes.
- The modular nature of SHERPA and the division of expertise means that we rarely have overlapping projects.
- When beginning a project, you know who might be relevant to work with in the collaboration.

## Main problem

### Personal opinion

Communication. It is key to a successful collaboration but very hard to do effectively.

## Best Practices

- Version control  
svn, git, hg ...
- Documentation  
in code, for users, for new developers
- Mailing lists  
for users, for developers
- Meetings

## Version control in SHERPA

see earlier talk on version control

- Version control: svn repository
- Development done in branches
- Responsibility to keep your branch up to date with main development
- Merge in only fully-formed, completed functionality into development branch
- Releases also implemented as branches

## Communication in SHERPA

- Meetings: Yearly meeting in person.
  - Good to learn what everyone is doing
  - Make a plan for the coming year
  - Most people have to travel to host city
  - Difficult to organise around other commitments
- Phone: Occasionally, had fortnightly for a while but was not productive
- Subgroups for projects meet more regularly.
- Meetings (frequency/style) very much up to individual projects

## Documentation in SHERPA

- Disclaimer: this is something we need to improve.
- Online documentation detailing different modules (also on the svn).
- Documentation also shipped with the sherpa vesion.
- Authors responsible for documenting their own work.



# SHERPA documentation example

The screenshot displays the Sherpa 2.2.0 documentation page. The browser window title is 'Sherpa 2.2.0 - Hepforge - Mozilla Firefox'. The address bar shows the URL 'https://sherpa.hepforge.org/doc/SHERPA-MC-2.2.0.html'. The page content includes:

- Sherpa home**
- Downloads**
  - Current Version: 2.2.0
  - Older Versions
- Documentation**
  - Manual for Sherpa 2.2.0
  - Older Versions
- Bug tracker**
- Browse source code**
- Internal**
- Contact**
- BuildBot**
- Dashboard (alpha)**

## Sherpa Manual Version 2.2.0

The Sherpa Team, see <http://sherpa.hepforge.org>

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## Sherpa 2.2.0 Manual



- 1 Introduction
- 2 Getting started
- 3 Command line options
- 4 Input structure
- 5 Parameters
- 6 Tips and tricks
- 7 A posteriori scale variations
- 8 Customization
- 9 Examples
- 10 Getting help

What is Sherpa  
A guide to getting started with Sherpa  
Sherpa's command line options  
How to specify parameters for a Sherpa run  
The complete list of parameters  
Advanced usage tips

Extending Sherpa  
Examples to illustrate some of Sherpa's features  
What to do if you have questions about Sherpa

Download in other formats:  
High Text

Powered by  Trac 1.8.8  
By Eigenval Software

Sherpa

Last modified 2 years ago

# SHERPA documentation example

The screenshot shows a web browser displaying the Sherpa Manual Version 2.2.0. The browser address bar shows the URL <https://sherpa.hepforge.org/doc/SHERPA-MC-2.2.0.html>. The page title is "Sherpa Manual Version 2.2.0" and the subtitle is "The Sherpa Team, see <http://sherpa.hepforge.org>".

Below the manual page, there is a "Custom Query" interface. The URL in the browser address bar is <https://sherpa.hepforge.org/trac/query/status=assigned&status=new&status=reopened&type=question&f>. The interface includes a search bar, a "View Tickets" button, and a "Wiki" link. The "Custom Query" section shows filters for Status (assigned, closed, new, reopened), Type (is not, question, or setup), and a "Avl" dropdown. The "Columns" section includes checkboxes for Summary, Status, Type, Owner, Priority, Milestone, Component, Version, Resolution, Created, Modified, Reporter, Keywords, and Cc. The "Group results by" dropdown is set to "Milestone" and "descending". The "Show under each result" checkbox is unchecked, and "Max items per page" is set to 100. The "Update" button is visible.

The "Milestone: perfect" section shows 0 matches. The "Milestone: rel-2.2.1" section shows 0 matches.

Ticket	Summary	Status	Type	Priority	Milestone	Component
#190	Decays: Width treatment and resolving offshell decays	new	task	major	perfect	Unknown
#232	Enable dipole subtraction for processes with decays into coloured particles	assigned	enhancement	major	perfect	Unknown
#288	Error in OnelDop and Cross section is "bar"	new	defect	major	perfect	ME Generator
#383	Fix "bugs" found by static code analysis	new	task	minor	perfect	Hadron Decays

Ticket	Summary	Status	Type	Priority	Milestone	Component
#340	Close violations in re-optim	new	defect	critical	rel-2.2.1	MF Corestrata

## Mailing list

- Have a bug tracker for people to report bugs
- Have a users mailing list for updates
- Have an authors' mailing list for changes
- Have an automatic compilation check that e-mails failed compilation.

# Mailing list examples

Re: New clustering

<https://email.gwdg.de/owa/?ae=Item&t=IPM.Note&id=RgAAAAADL...>

**Re: New clustering**

sherpa-bounces@projects.hepforge.org on behalf of Stefan Hoeche [shoeche@slac.stanford.edu]

Sent: 10 December 2015 23:45

To: sherpa@projects.hepforge.org

Hi all,

most of the problems should now be fixed. You can give the most recent 'unlops' branch a try. This will hopefully evolve into version 2.2.x soon.

Cheers  
Stefan

On 11/26/2015 07:41 PM, Stefan Hoeche wrote:

```
>  
> Hi all,  
>  
> it turned out that there is an issue with the new inclusive cluster  
> mode, so please do not run any serious tests just yet. I will let you  
> know when this is fixed.  
>  
> Cheers  
> Stefan  
>  
>
```

> On 11/25/2015 03:14 PM, Stefan Hoeche wrote:

```
>>  
>> Hi all,  
>>  
>> I have re-implemented the current ME+PS clustering routines and  
>> streamlined the cross-talk between ME generators and showers. If you  
>> would like to help crash-test the new technology and/or if the old  
>> methods don't work for you, please try the most recent 'unlops' branch.  
>> There are several things which have not been looked at so far, most
```

# Mailing list examples

Re: [Bug] #205: Trac settings don't allow view WikiFormatting page

<https://email.gwdg.de/owa/?ae=Item&t=IPM.Note&id=RgAAAADL...>

## Re: [Bug] #205: Trac settings don't allow view WikiFormatting page

sherpa-bounces@projects.hepforge.org on behalf of Sherpa [sherpa@projects.hepforge.org]

Sent: 23 November 2015 12:47  
Cc: sherpa@projects.hepforge.org

Re: New clustering

### Re: New clustering

sherpa-bounces@projects

Sent: 10 December 2015 23:45

To: sherpa@projects.hepforge.org

#205: Trac settings don't allow view WikiFormatting page

```
-----
Reporter: user | Owner: fsiegert
Type: defect | Status: closed
Priority: trivial | Milestone: rel-1.4.0
Component: Unknown | Version: 0.trunk
Resolution: fixed | Keywords: Trac permissions block help
-----
```

Hi all,

most of the problems sh  
'unlops' branch a try.

Comment (by anonymous):

yes i do

Cheers  
Stefan

--  
Ticket URL: <<https://sherpa.hepforge.org/trac/ticket/205#comment:4>>  
Sherpa <<http://sherpa.hepforge.org/>>

On 11/26/2015 07:41 PM,

> sherpa mailing list  
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> <https://www.hepforge.org/lists/listinfo/sherpa>

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> mode, so please do not  
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12/05/16 11:21

# Mailing list examples

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<https://email.gwdg.de/owa/?ae=Item&t=IPM.Note&id=RgAAAADL...>

**Re: [Bug] #205: Trac settings don't allow view WikiFormatting page**

sherpa-bounces@projects.hepforge.org on behalf of Sherpa [sherpa@projects.hepforge.org]

Sent: 23 November 2015 12:47  
Cc: sherpa@projects.hepforge.org

Re: New clustering

#205: Trac settings don't allow view WikiFormatting page

```
-----
New OpenLoops release (including COLLIER)
sherpa-bounces@projects.hepforge.org on behalf of Jonas Lindert [lindert@physik.uzh.ch]
Reported by: user | Owner: fsiegert | https://email.gwdg.de/owa/?ae=Item&t=IPM.Note&id=RgAAAADL...
Type: defect | Status: closed
-----
```

**New OpenLoops release (including COLLIER)**

sherpa-bounces@projects.hepforge.org on behalf of Jonas Lindert [lindert@physik.uzh.ch]

Sent: 25 April 2016 11:16  
To: openloops-announce@projects.hepforge.org  
Hi all,  
Cc: Massimiliano Grazzini [grazzini@physik.uzh.ch]; PLATZER S. [simon.platzer@durham.ac.uk]; kallweit [kallweit@physik.uzh.ch]; Dirk Rathlev [dirkrathlev@gmx.de];  
SELLM J.O. [jo.hannes.sellm@durham.ac.uk]; milten [milten@physik.wth-aachen.de]; Sam Tom Guise [sguise@t1.gwdg.de]; giorgio.kern@cern.ch; Reuschle, Christian (TTP)  
[christian.reuschle@kit.edu]; GONCALVES-NETTO D. [dornival.goncalves@durham.ac.uk]; Gieseke, Stefan (TTP) [stefan.gieseke@kit.edu]; catalin  
[catalin@physik.uzh.ch]; Christian Bauer [cwbauer@bl.gwdg.de]; sherpa@projects.hepforge.org; Ben Morgan@warwick.ac.uk; Vitaliano.Ciufi@cern.ch; Marius  
Wiesemann [mariusw@physik.uzh.ch]; Cyril Becot [cyril.becot@cern.ch]  
Attachments: ATT00001.txt (212 B)

Cheers  
Stefan

Dear OpenLoops user,

On 11/26/2015 we just released an updated version of OpenLoops (OpenLoops-1.3, svn: 1942; <http://www.hepforge.org/archive/openloops/OpenLoops-1.3.0.tar.gz>). If you downloaded the previous version via svn in order to update you can simply run:  
> Hi all,  
>  
> ./openloops update

> it turned out This version is the first public release including the tensor reduction library COLLIER (in version collier-1.0)  
> mode, so pl developed by A. Denner, S. Dittmaier and L. Hofer. Using OpenLoops together with COLLIER will further  
> know when t significantly increase the performance of most one-loop amplitudes. In particular its high degree of numerical  
> stability requires a significantly smaller amount of phase-space points to be reevaluated at higher numerical  
> Cheers precision. Furthermore, especially the performance of loop-squared amplitudes highly benefits from the  
> Stefan tensor integral reduction implemented in COLLIER.  
>

> On 11/25/2015 For the moment CutTools remains our default reduction library. However, we recommend to use the COLLIER  
>> Hi all, library everywhere. You can switch to COLLIER setting the OpenLoops parameter preset=2 (for loop-induced  
>> processes preset=3 should be used); for example in any Sherpa Run-Card one can set:  
>> I have re- OL\_PARAMETERS preset 2  
>> streamline  
>> would like  
>> methods do  
>> There are

Additionally this new release contains various improvements and bugfixes as detailed on our hepforge page (<http://openloops.hepforge.org/log.html>).

12/05/16 11:21

## Conclusions

- Advantages and disadvantages to working in a large collaboration for programming
- Necessary for large scale projects which draw on a wide range of expertise
- There are lots of different tools to make the collaboration easier
- Communication with each other and with users is vital