

Nektar++ Welcome and Overview

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NEKTAR++

SPECTRAL/HP ELEMENT FRAMEWORK

Schedule

Wednesday 14th June

12:00 – 13:00 Registration, Welcome and Lunch

13:00 – 15:00 **Session 1** (20 minute presentations from the Team Leaders/Senior developers)

13:00 | “*Welcome and Overview*”, Mike Kirby

13:20 | “*Library Updates*”, Spencer Sherwin

13:40 | “*NekMesh: New features and functionality*” Dave Moxey

14:00 | “*Improvements to post-processing in Nektar++*”, Douglas Serson

14:20 | “*Multiphysics Simulations with Nektar++ using a Co-Simulation Approach*” Kilian Lackhove

14:40 | “*Nektar++ 5.0*”, Chris Cantwell

15:00 – 15:30 **Refreshment break & Posters**

15:30 – 17:30 **Session 2** (15+5 minute presentations from users)

15:30 | “*Accuracy and robustness of CG/DG for spatially developing under-resolved turbulent flows*”. Rodrigo Moura

15:50 | “*Large eddy simulation of wind flow over rough terrain with Nektar++*”, Bofu Wang

16:10 | “*Regime C flow around an oscillating circular cylinder*”, Feifei Tong

16:30 | “*Various types of hydrodynamic instability in the corrugated channel*”, Stan Gapner

16:50 | “*Spectral Element Methods for Nonlinear Wave-Structure Interactions in Marine Hydrodynamics*”, Andreas Mieritz

17:10 | *TBD*, Mohammad Rahmati

19:00 – 21:00 Workshop dinner

Schedule

Thursday 15th June

09:00 – 10:30 **Session 3** (15+5 minutes presentations)

09:00 | “*The method of moving frames for Maxwell’s equations on curved surfaces with Nektar++*”, Ehsan Kazemy

09:20 | “*Method of moving frames at Nektar++: current and future*”, Sehun Chun

09:40 | “*Towards resilience at exascale: memory-conservative fault tolerance in Nektar++*”, Chris Cantwell

10:00 | “*Web tools for the efficient and robust configuration of Nektar++ simulations*”, Jeremy Cohen

10:20 | “*Parametric Model Order Reduction with Nektar++*”, Martin Hess

10:40 | “*TBD: Rolls-Royce challenges*”, Luigi Capone

10:30 – 11:00 **Refreshment break & Posters**

11:00 – 12:15 **Session 4: Invited talk**

“Seismic Simulations in the Days of Deep Learning Hardware”

Dr Alexander Heinecke, Intel Labs

12:15 – 12:30 Summary and introduction to group sessions.

12:30 – 14:00 **Lunch & Posters**

14:00 – 17:00 Break-out group sessions

Friday 16th June

09:00 – 14:00 Break-out group sessions

Community

- **User:** Individuals or teams who use Nektar++ as part of their research and who may interact with the community through the mailing list but do not directly contribute code.
- **Contributor:** Individuals or teams who use Nektar++ as part of their work but also contribute modifications back into the code which arise as a direct consequence of their research.
- **Developer:** Individuals who use Nektar++ for their research, and make code contributions which not only benefit their own research goals but also benefits the wider needs of the Nektar++ community. Such contributions typically benefit multiple application domains, and developers will make the extra effort to generalise new functionality beyond their own needs. They also fix bugs, identified by others, in areas of the code with which they are familiar.
- **Senior Developer:** Senior Developers are involved in the development of Nektar++ beyond their individual research area and interact in more of a transcendent way, making contributions widely across the codebase. Senior developers are entrusted with the tasks of reviewing and merging contributions made by others and maintaining the integrity of the code.
- **Project Leader:** These individuals meet all the requirements of Senior Developers but in addition direct how Nektar++ evolves in terms of applications, solvers, library and educational outreach.

Community

- **(Active) Senior Developers:** Mike Turner, Gianmarco Mengaldo, Killian Lackhove and Douglas Serson
- **Project Leaders:** Spencer Sherwin (Founder), Mike Kirby (Founder), Chris Cantwell and Dave Moxey

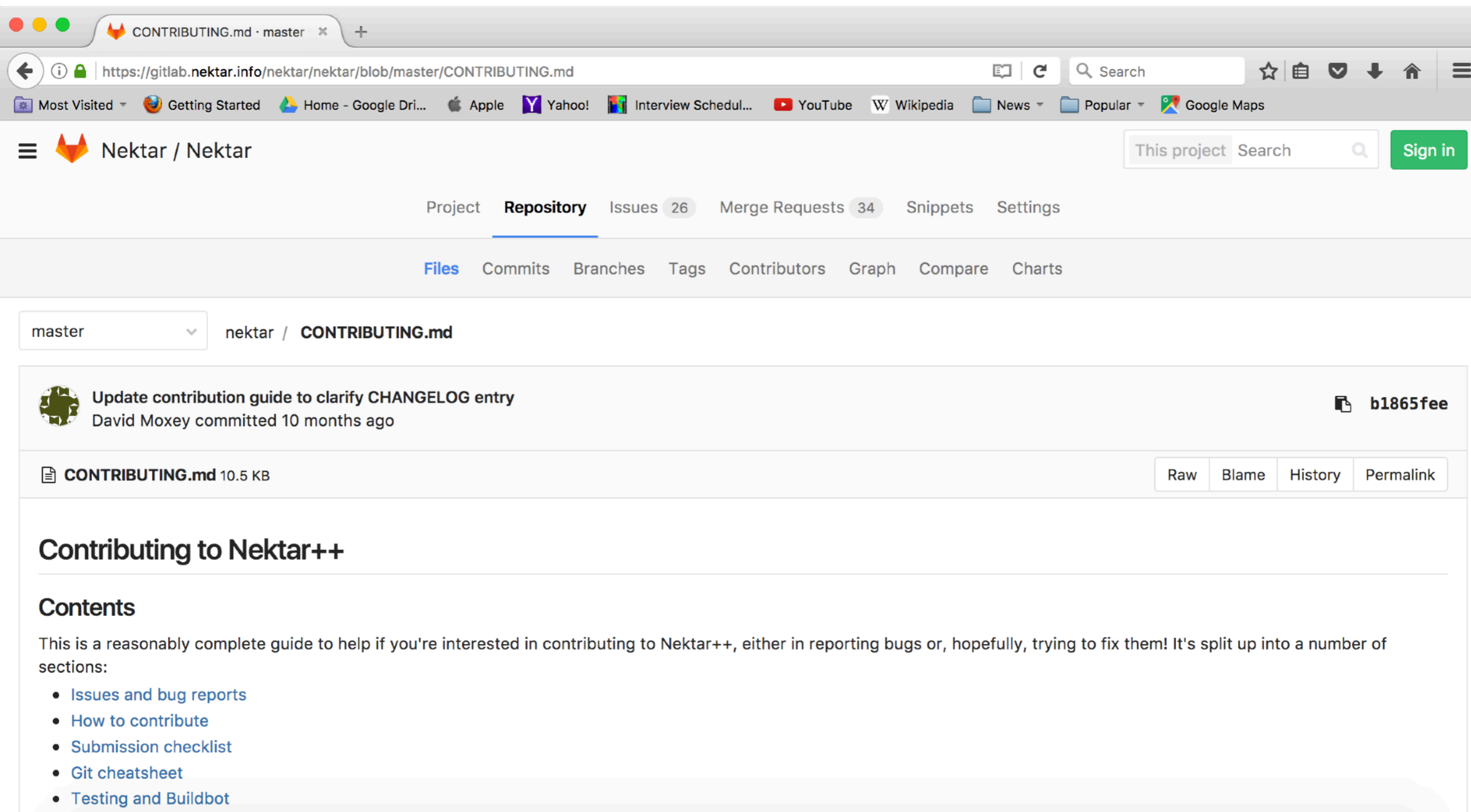
Community: Who Is Involved

- 2000+ downloads since March 2017
- Experiencing Wider Usage (70+ references to Nektar++ paper by Cantwell et al.):
 - ♦ Automated Generation and Symbolic Manipulation of Tensor Product Finite Elements by McRae et al.
 - ♦ The Multi-Level hp-method for Three-Dimensional Problems: Dynamically Changing High-Order Mesh Refinement With Arbitrary Hanging Nodes by Zander et al.
 - ♦ Flow Stability Community Papers
 - ♦ Visualization Community Papers

Community: How To Get Involved



- nektar.info
- Send us your papers to include on website
- Make sure to reference the paper:
 - ♦ C.D. Cantwell, D. Moxey, A. Comerford, A. Bolis, G. Rocco, G. Mengaldo, D. de Grazia, S. Yakovlev, J-E Lombard, D. Ekelschot, B. Jordi, H. Xu, Y. Mohamied, C. Eskilsson, B. Nelson, P. Vos, C. Biotto, R.M. Kirby and S.J. Sherwin, "**Nektar++: An open-source spectral/hp element framework**", Computer Physics Communications, Volume 192, pages 205-219, 2015.


Engaging the Community



The screenshot shows a web browser displaying the Nektar++ repository's CONTRIBUTING.md file on GitLab. The browser's address bar shows the URL `https://gitlab.nektar.info/nektar/nektar/blob/master/CONTRIBUTING.md`. The page header includes the Nektar logo and the text "Nektar / Nektar". The repository navigation bar shows "Project", "Repository" (selected), "Issues 26", "Merge Requests 34", "Snippets", and "Settings". Below this, there are links for "Files", "Commits", "Branches", "Tags", "Contributors", "Graph", "Compare", and "Charts". The file name "CONTRIBUTING.md" is shown with a size of 10.5 KB. A commit history section shows a commit by "b1865fee" titled "Update contribution guide to clarify CHANGELOG entry" by David Moxey, committed 10 months ago. The main content area is titled "Contributing to Nektar++" and includes a "Contents" section with a list of links: "Issues and bug reports", "How to contribute", "Submission checklist", "Git cheatsheet", and "Testing and Buildbot".

master nektar / **CONTRIBUTING.md**

 **Update contribution guide to clarify CHANGELOG entry**
David Moxey committed 10 months ago  **b1865fee**

 **CONTRIBUTING.md** 10.5 KB Raw Blame History Permalink

Contributing to Nektar++

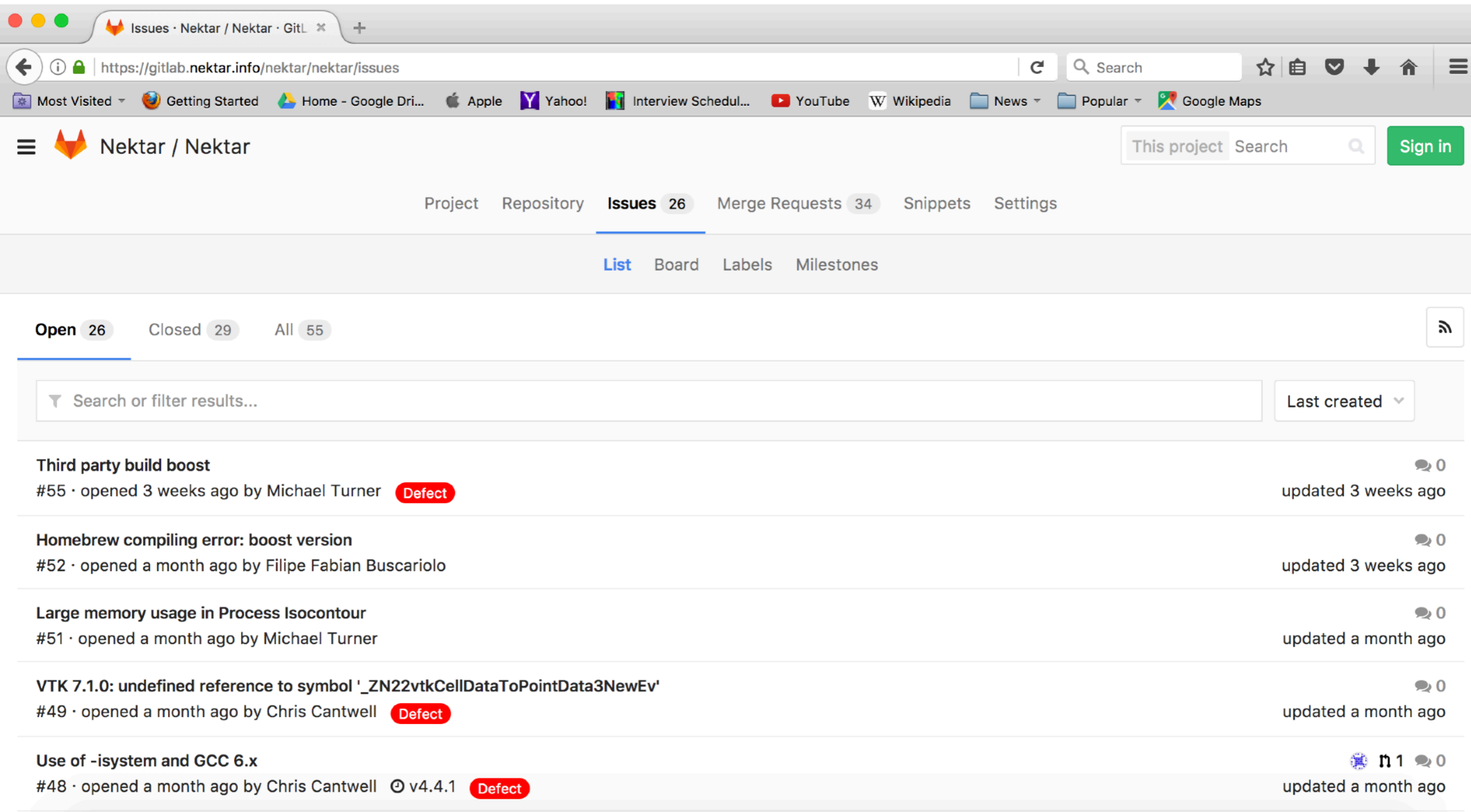
Contents

This is a reasonably complete guide to help if you're interested in contributing to Nektar++, either in reporting bugs or, hopefully, trying to fix them! It's split up into a number of sections:

- [Issues and bug reports](#)
- [How to contribute](#)
- [Submission checklist](#)
- [Git cheatsheet](#)
- [Testing and Buildbot](#)



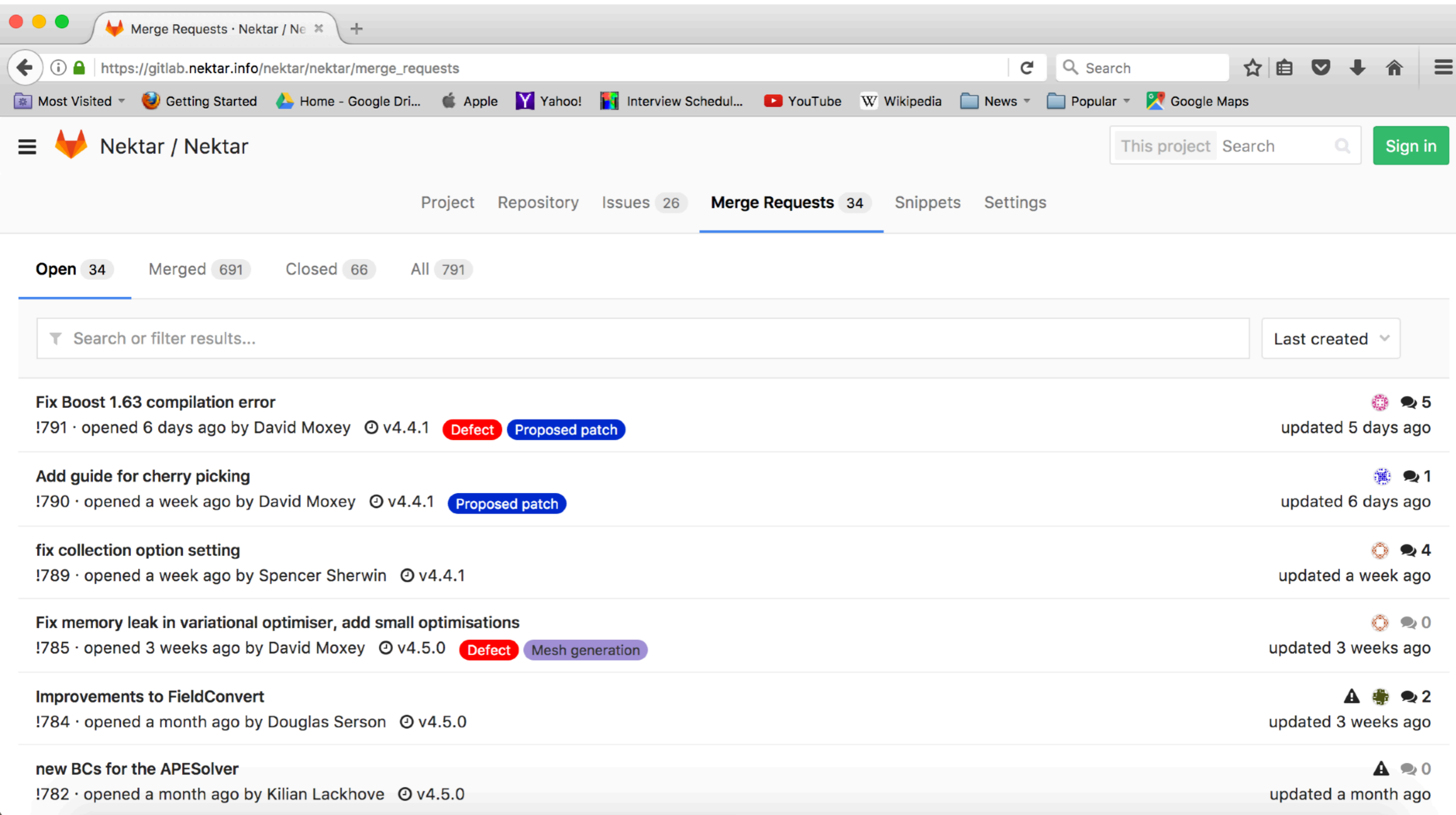
Engaging the Community



The screenshot shows the GitLab interface for the Nektar++ project. The browser address bar displays the URL `https://gitlab.nektar.info/nektar/nektar/issues`. The page header includes the Nektar logo and navigation links for Project, Repository, Issues (26), Merge Requests (34), Snippets, and Settings. Below the header, there are tabs for List, Board, Labels, and Milestones. The main content area shows a list of issues, with filters for Open (26), Closed (29), and All (55). A search bar and a dropdown for sorting by 'Last created' are also present. The list of issues includes:

- Third party build boost** (#55) · opened 3 weeks ago by Michael Turner · Defect · updated 3 weeks ago
- Homebrew compiling error: boost version** (#52) · opened a month ago by Filipe Fabian Buscariolo · updated 3 weeks ago
- Large memory usage in Process Isocontour** (#51) · opened a month ago by Michael Turner · updated a month ago
- VTK 7.1.0: undefined reference to symbol '_ZN22vtkCellDataToPointData3NewEv'** (#49) · opened a month ago by Chris Cantwell · Defect · updated a month ago
- Use of -isystem and GCC 6.x** (#48) · opened a month ago by Chris Cantwell · v4.4.1 · Defect · updated a month ago

Engaging the Community



The screenshot shows the GitLab interface for the Nektar++ project, specifically the Merge Requests section. The browser address bar shows the URL `https://gitlab.nektar.info/nektar/nektar/merge_requests`. The page header includes the Nektar++ logo and navigation links for Project, Repository, Issues (26), Merge Requests (34), Snippets, and Settings. A search bar is present in the top right. Below the header, there are filters for Open (34), Merged (691), Closed (66), and All (791). A search bar and a dropdown menu for sorting by 'Last created' are also visible. The main content area lists several merge requests:

- Fix Boost 1.63 compilation error**: !791 · opened 6 days ago by David Moxey · v4.4.1. Status: Defect, Proposed patch. 5 comments, updated 5 days ago.
- Add guide for cherry picking**: !790 · opened a week ago by David Moxey · v4.4.1. Status: Proposed patch. 1 comment, updated 6 days ago.
- fix collection option setting**: !789 · opened a week ago by Spencer Sherwin · v4.4.1. Status: Open. 4 comments, updated a week ago.
- Fix memory leak in variational optimiser, add small optimisations**: !785 · opened 3 weeks ago by David Moxey · v4.5.0. Status: Defect, Mesh generation. 0 comments, updated 3 weeks ago.
- Improvements to FieldConvert**: !784 · opened a month ago by Douglas Serson · v4.5.0. Status: Open. 2 comments, updated 3 weeks ago.
- new BCs for the APESolver**: !782 · opened a month ago by Kilian Lackhove · v4.5.0. Status: Open. 0 comments, updated a month ago.

Develop Guide

- Yes ... it is coming soon!
- Plan is to discuss the library components (LibUtilities, StdRegions, etc.):
 - ◆ Mathematical Overview
 - ◆ Basic Structure
 - ◆ Question/Answer Format: How would I ...?