

# Past and future of deal.II

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- National Science Foundation



National Science Foundation  
WHERE DISCOVERIES BEGIN

- Texas A&M, Institute for Applied Mathematics and Computational Sciences

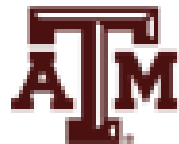


- Texas A&M University, Department of Mathematics

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**Mathematics**

- Texas A&M University, College of Science



**SCIENCE**  
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# The history of deal.II

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Nothing was planned.

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But it works. And we figured a few things  
out along the way.

# The history of deal.II

**Message 1: It's a vibrant project**

# The history of deal.II

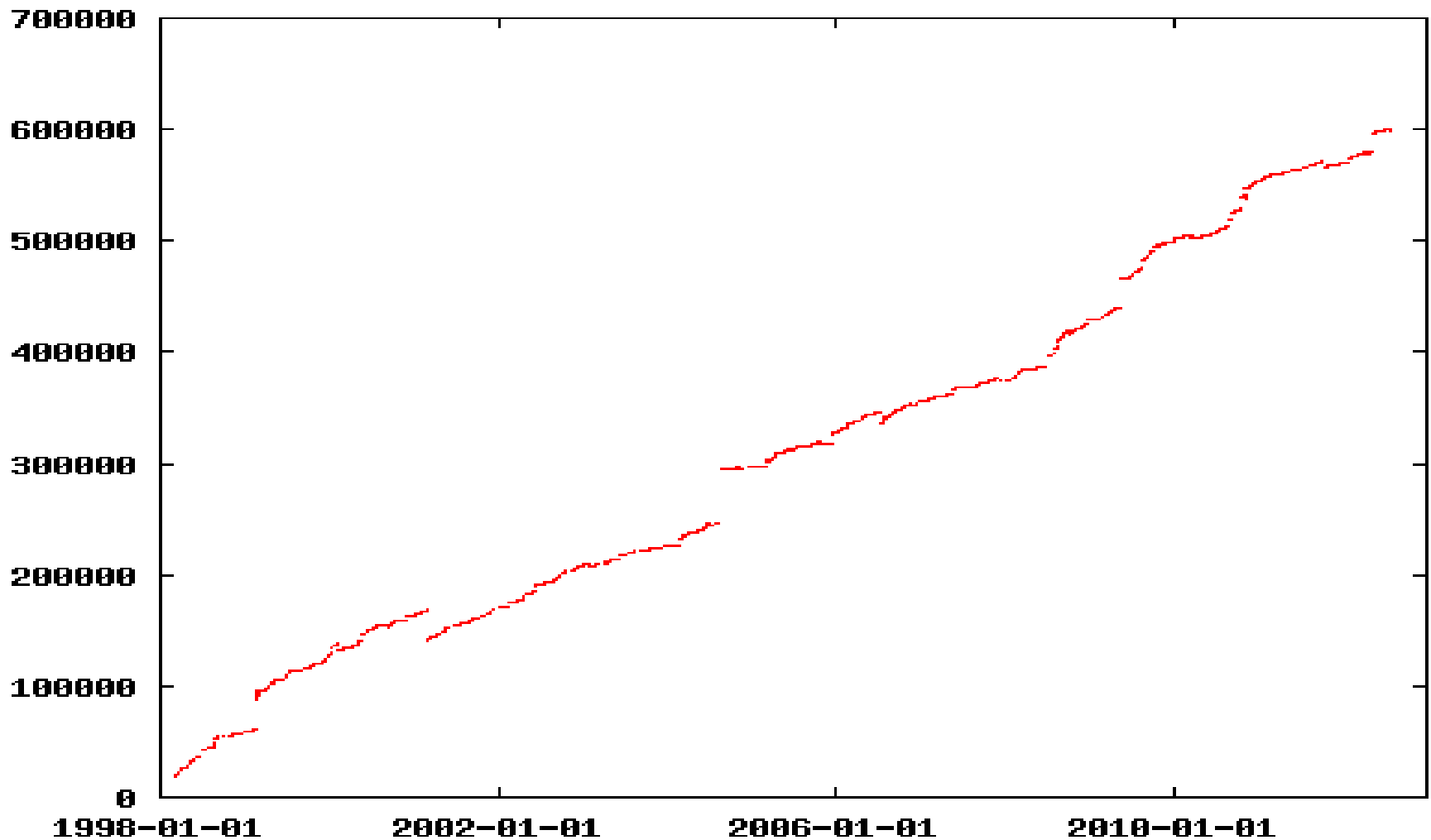
**Message 1: It's a vibrant project**

This is the fifth *deal.II* user and developer workshop

- Held 2006 → 2010 → 2012 → 2013 → 2015
- # of people on the mailing list at these times:  
80 → 260 → 365 → 219 → 540
- # of contributors:  
15 → 40 → 100 → 110 → 120

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Message 1: It's a vibrant project



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**Message 1: It's a vibrant project**

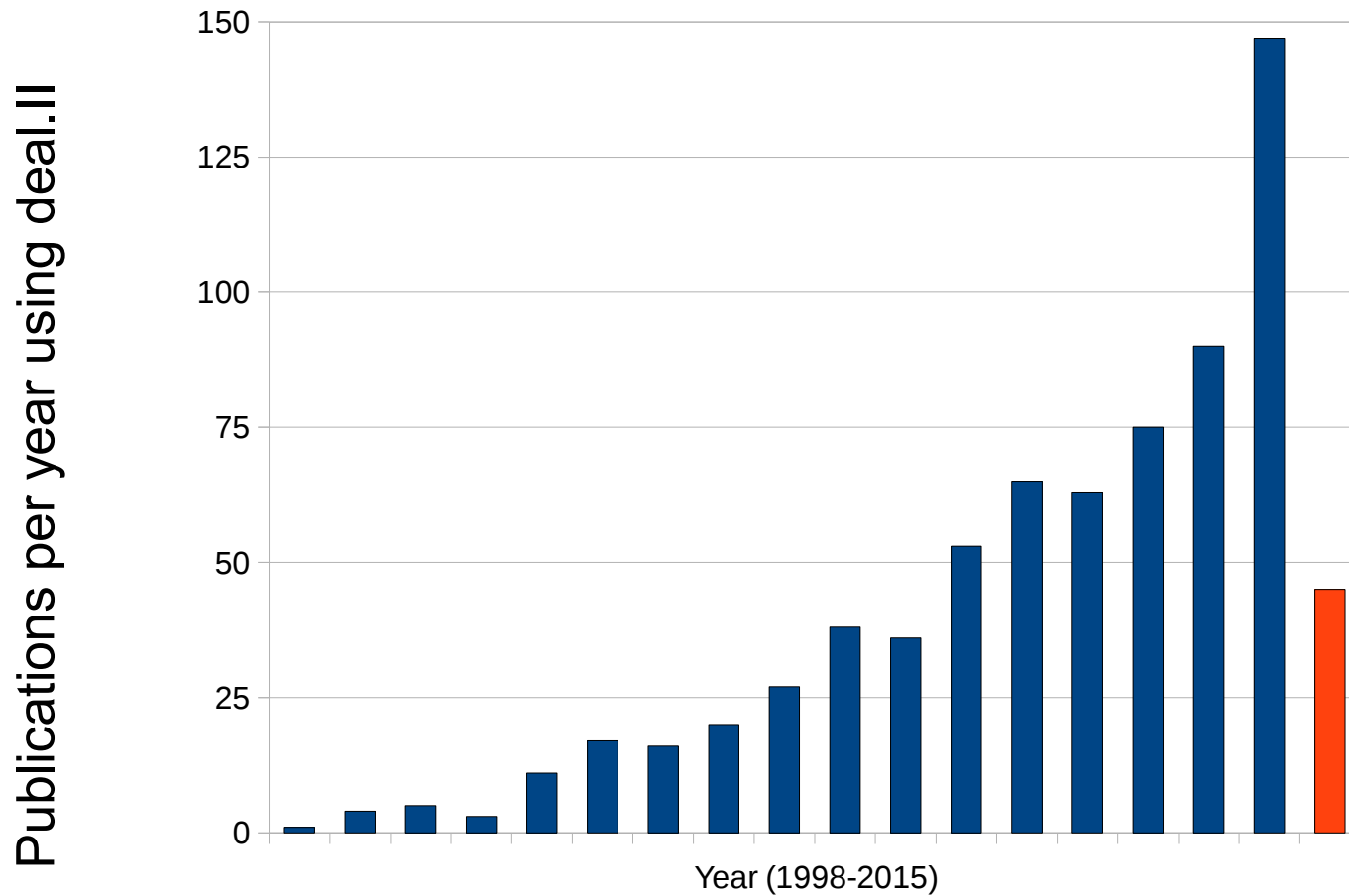
There is a constant stream of new, major features:

- Manifold descriptions
- Support for CAD geometries
- Parallelization improvements
- Configuration management
- Many new tutorial programs
- ...



# The history of deal.II

**Message 1: It's a vibrant project**



# The history of deal.II

**Message 2:** We've learned a few (technical) lessons.

- Managed almost continuous growth: 3-4000 lines per month
- Our code is reasonably modular:
  - users don't need to know internals of deal.II
  - developers don't need to know all of the library
- Reasonable documentation:
  - doxygen modules
  - tutorial programs
- We have a pretty good testsuite: ~8,000 tests run after each change
- But: Library has become a big piece of code – there is nobody any more who still knows everything

# The history of deal.II

**Message 3:** We've learned a few social lessons.  
But we still struggle with some.

- A lot more users
  - many more help requests than in the early years
- Nobody knows everything about everything any more
  - nobody can answer all questions
- Interfaces to many more external packages
  - much more complicated interactions
- A lot more actual and potential contributors
- Original developers have less time

# deal.II as a “social project”

deal.II is a project with a “community” that consists of groups

- Library maintainers
- People with knowledge of parts (“subsystem maintainers”)
- Other developers
  
- Users
  
- With every collection of groups, there are problems that we need to work on.

# deal.II as a “social project”

**For example:** Library maintainers vs other developers

- How can we attract more developers?
  - Are we encouraging enough in our attempts?
  - Can we make the “bar to entry” low enough?
  - Do we give adequate credit to contributors?
- 
- How do we ensure the long-term quality of deal.II?
    - Do even first time contributors have to write testcases?
    - How about documentation?
    - How can we enforce our coding styles?
    - Should we accept *every* contribution?

# deal.II as a “social project”

**For example:** Developers vs users

- How can we organize answering mails on the mailing list?
  - Can we organize it more equitably?
  - Can we ensure adequate response times?
  - Can we think of better ways of documenting stuff so that people can find them?
- 
- How can we entice users to become contributors?
  - How can we get users to work together on projects?

# What we're here for this week

- Hear about what deal.II is used for
- Make connections
- Hear about what's new in deal.II
- Get to know each other: people who know each other work better together
- Hatch plans for deal.II
- Figure out how to make the “social project” deal.II work better

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# What we're here for this week

People who know each other work better together:

- Know each other's opinions
- Don't need to write long emails
- Know about resources others might provide
- Don't as easily misunderstand each other
- Can pro-actively adjust what they do to the other person's taste

# What we're here for this week

**Working on common projects is more fun:**

- Someone else may already have part of what you need
- Maybe we can come up with things deal.II could use and that already exist in application code
- What are the big things we want in deal.II in the future?
- Who can help implement these things?

# What we're here for this week

## “Planning for the future” sessions:

- Secure continued funding for development
- Supporting IDEs
- deal.II on Windows
- Packaging
- Parallel linear algebra

## One demonstration session:

- Changing code and contributing patches

**For now:**

Go forth, make friends,  
and contribute to the code