

CIG Perspectives on 14 Years of Sustaining Software and a Community of Practice in Computational Geodynamics

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The CIG Community



geodynamics.org



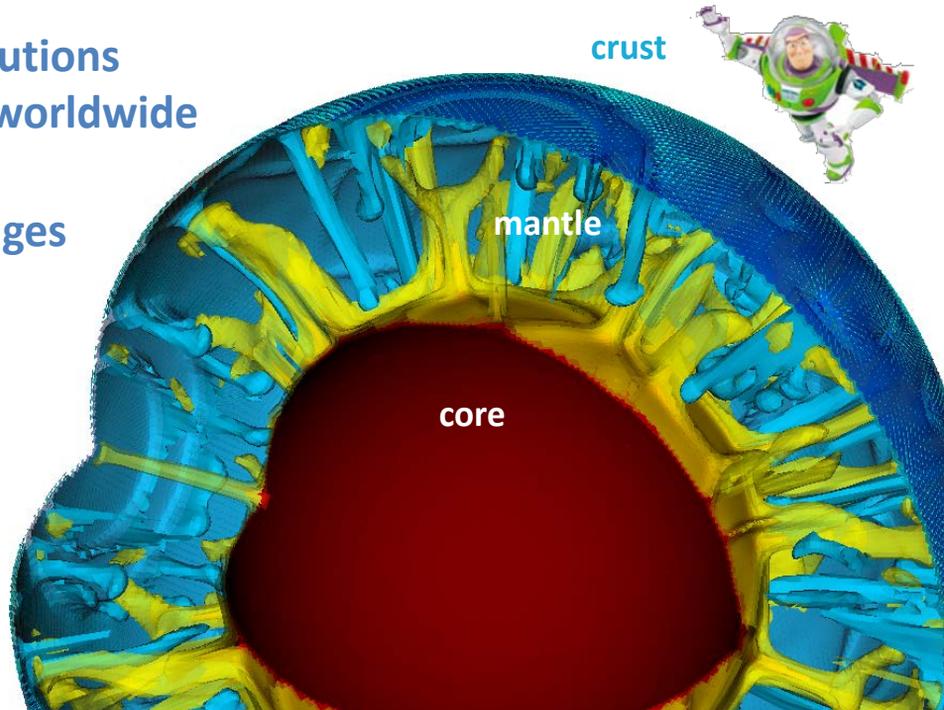
 CIG is funded by the NSF's Geoinformatics program (in GEO-EAR) with contributions from NSF's Office of Advanced Cyberinfrastructure

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Who we are...

The Computational Infrastructure for Geodynamics (CIG) is a **community-driven** organization that advances Earth science by developing and disseminating software for geophysics and related fields.

- 85+ member institutions
- 900+ participants worldwide
- 20 countries
- 33 software packages
- Used worldwide



Entirely
CIG
funded

Software Development



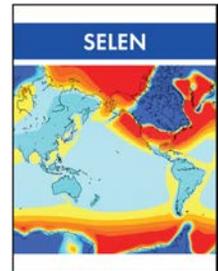
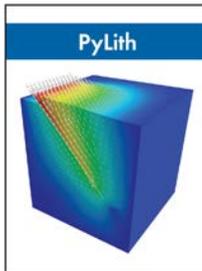
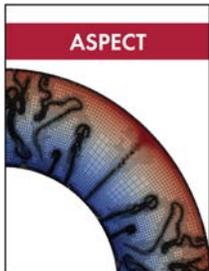
Successful CIG codes mix community
and CIG development and support



Community
Contributed

Building and sustaining teams

software engineering, computational, & domain expertise



EVERYTHING IS COOL WHEN YOU ARE PART OF A TEAM.





developers



researchers



sustaining communities



sustaining innovation



communities

small vs. large



international

Supporting Researcher-Developers



Hackathons



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Hackathon

= hack + marathons

= sprint + scrum + mini-tutorials



“The third and last day...is reserved for the Hackday. During the Hackday, attendees collaborate on a project that will be presented at the end of the day and have the chance to win a prize. This year the first prize is...”



“To further the development of... ASPECT and its user community, current users and developers of ASPECT will be working side-by-side over an approximately 10 day period. Participants will make significant progress both on the development of ASPECT itself, as well as on the models individual users are building for their own research.”



Hackathon



Length: Weekend+

Focus: Maybe multiple

Expertise: Undetermined

Sleep: Optional

Communication: Little

Teams: Static

Rewards: Pizza, \$\$\$



Enforced free & quiet time

Daily updates

Flexible

Science! Dissertation!



EVERYTHING IS AWESOME

Hackathon Structure

Beginning

Leaders:

- establish project specific conventions
- demonstrate workflows
- review relevant technical skills
- identify starter projects and merge issues

Daily

- work plans

I can help ...

I know how...

I am interested ...

I tried that ...

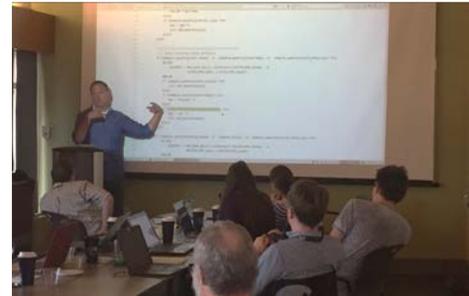
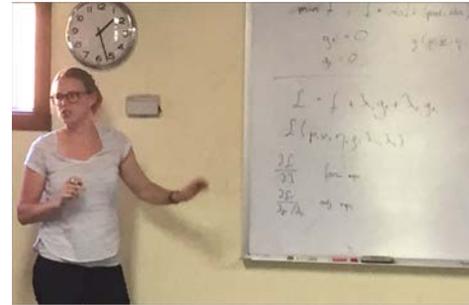
As Needed

- science and coding briefs
- mini-tutorials
- adjustments

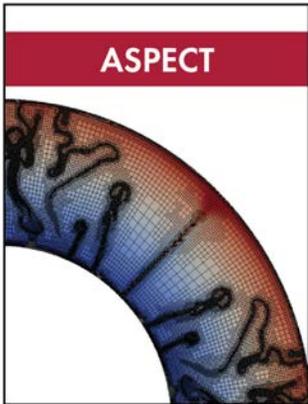
Required from ALL Participants



MUST HAVE AT LEAST ONE COMMIT

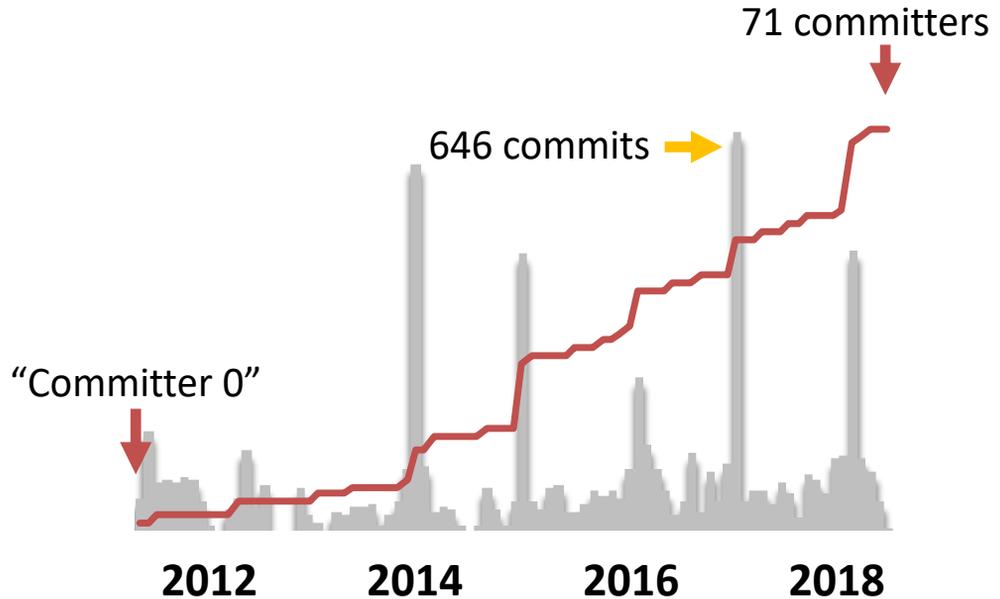


A 7 year record of growth...

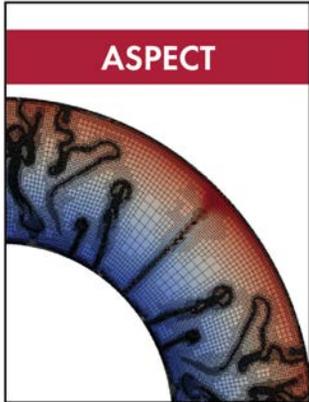


Principal Developers:

- Wolfgang Bangerth
- Timo Heister
- Rene Gasmöeller
- Juliane Dannberg



A dedicated team...

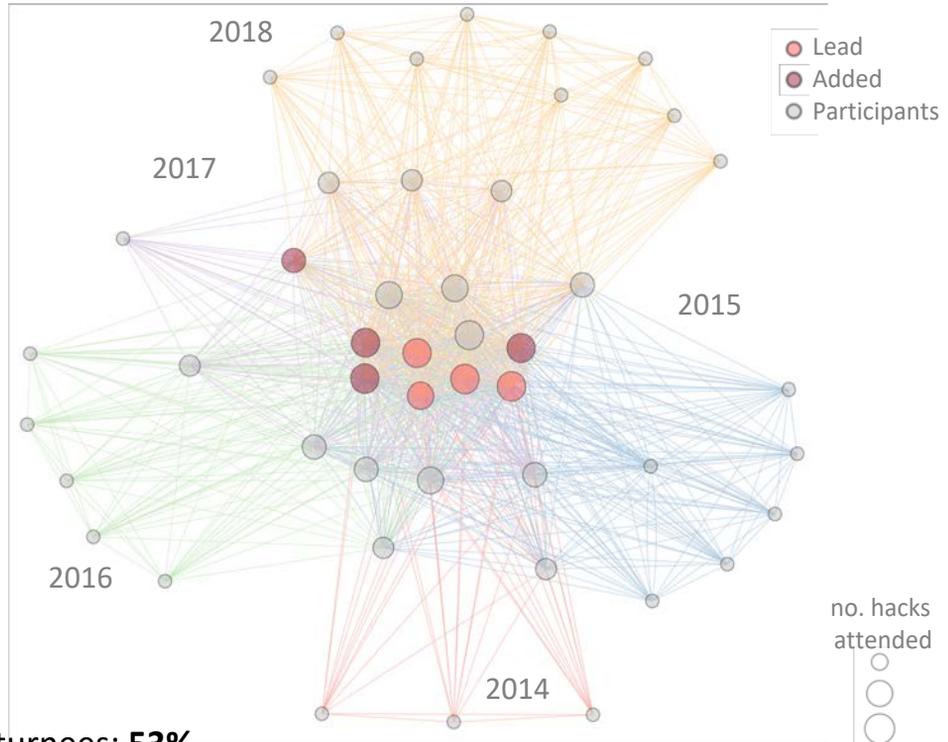


Principal Developers:

Wolfgang Bangerth
Timo Heister
Rene Gassmoeller
Juliane Dannberg

AND

Jacky Austermann
Menno Fraters
Anne Glerum
John Naliboff



Returns: **53%**

100% attendance: **8**

Developers: **4+4= 8**

Impact Publications

1 degree

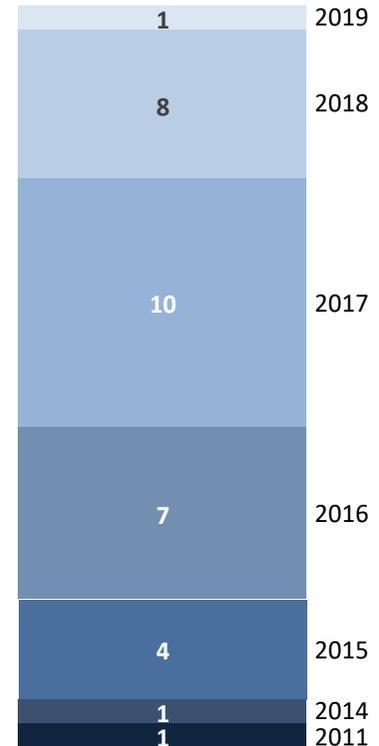
- **75% (24)** has one hacker author
- **6% (2)** has one tutorial attendee author

2 degrees

- **9% (3)** thesis from students whose advisor is a hacker
- **6% (~2)** hacker colleague

Mystery

- **3% (1)**



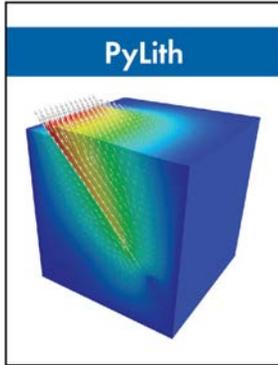
Total: 32

Impact Networks

- Research groups are well represented
- Developers have more publications
- Early developers central to other networks

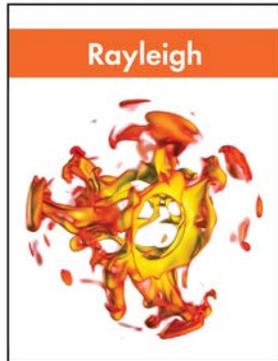


Reproducing the Model



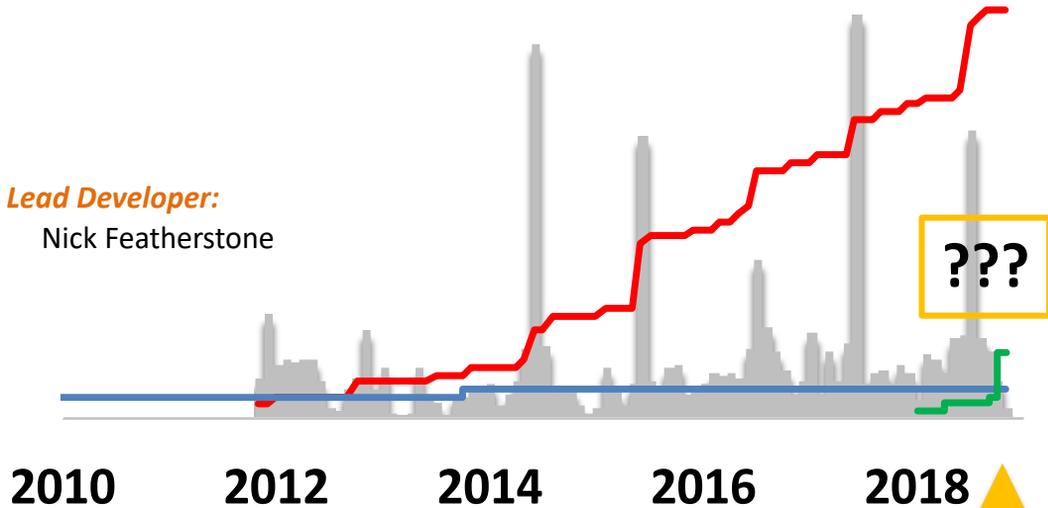
Lead Developers:

Brad Aagaard
Matt Knepley
Charles Williams



Lead Developer:

Nick Featherstone



TOKAU DORM

| | | | | | |
|---------------------------------|---------------------------------|----------------------------------|--|------------------|----------------|
| Rm 8 a. <i>Rox</i> b. | Rm 6 a. <i>Bredan</i> b. | Rm 4 a. <i>Branecty</i> b. | Rm 2 a. <i>Kelby</i> b. | Front Room Tokau | 1. a. b. |
| Rm 7 a. <i>Puckett</i> b. | Rm 5 a. <i>Thielot</i> b. | Rm 3 a. <i>Glennum</i> b. | Rm 1 a. <i>Dannberg</i> b. <i>Gasmaker</i> | End Room Tokau | 2. a. b. |

MIWOK DORM

| | | | | | |
|---|-------------------------------|----------------------------------|--------------------------------|---------------------------------|----------------|
| Rm 2 a. <i>Remy</i> b. <i>Houts</i> | Rm 4 a. <i>Moore</i> b. | Rm 6 a. <i>Fraters</i> b. | Rm 8 a. <i>Grove</i> b. | Rm 10 a. <i>Tarlow</i> b. | Rm a. b. |
| Rm 1 a. <i>Austermann</i> b. | Rm 3 a. <i>Huang</i> b. | Rm 5 a. <i>Randolph</i> b. | Rm 7 a. <i>Myhill</i> b. | Rm 9 a. <i>Stamps</i> b. | Rm a. b. |



- ⊖ Every community is unique
- ⊖ Hackathons build skills and sense of community
- ⊖ Takes sustained effort to build communities



THE END

