



Research Highlight

Revisiting Open Source Libraries for Solving ODEs

Many of CIG's large flagship codes – for example Rayleigh, PyLith, SPECfEM, and ASPECT – solve partial differential equations. There is of course a long history of writing such codes and part of this history is that traditionally, PDE solvers have hand-rolled their own time integrators and nonlinear solvers: Exceptions – such as PyLith – notwithstanding, they generally use low-order time discretization methods (such as explicit or implicit Euler, Crank-Nicolson, or BDF-2) with time-step sizes based on CFL numbers rather than accuracy considerations; and they implement nonlinear solvers via fixed point iterations or relatively simple variations of Newton's method, but without sophisticated line search, trust region, or acceleration methods.

This reliance on hand-written methods is perhaps surprising because we have all learned that at least for the discretization of PDEs, we should build on one of the widely used software libraries that provide everything one needs for the task: ... [\[full article\]](#)

contributed by

[Wolfgang Bangerth](#), Colorado State University Fort Collins; Juliane Dannberg, University of Florida; Rene Gassmoeller, University of Florida

From HQ

Dear Community,

This year summer brought both the heat and a flurry of activity.

CIG organized planning and coding meetings over the summer in support of ASPECT, PyLith and Rayleigh (and SPECfEM in Fall 2022). A total of 53 individuals participated in these activities. CIG also supported the 2023 CIDER Summer Program on plate boundary science with lectures and tutorials on rifting processes and modeling exercises using ASPECT. It was exciting to meet the next generation of scientists and will be more exciting to watch their careers grow in the upcoming years.

As we begin planning for 2023-2024, we look to strengthening our ties across Earth science communities. We will offer a workshop at SCEC this Fall (see below) to encourage sharing and receiving credit for software. Collaborating with CSDMS, SZ4D and community members on furthering model interoperability will bring together this coming spring a interdisciplinary group of researchers in computation, mathematics and science. Look for more announcements as plans develop.

CIG's mission "to provide the infrastructure for the development and dissemination of software" embodies our interest and commitment to the community. We are engaged in outreach and building quality software and their communities. See our [collaboration policy](#) to learn about ways CIG can facilitate your research projects. Going forward, collaborations with the community will strengthen our availability to address pressing cross-cutting issues that face us globally. Don't hesitate to contact us with your ideas to bring our communities together and further better software for our community.

Bruce Buffett & Lorraine Hwang, coDirectors

New in Software

Tool: ASPECT Virtual Desktop

Try ASPECT by launching its virtual desktop from our website. From the *Software: Launch* menu, select *ASPECT Virtual Desktop* and either navigate to its software landing page for more information or launch the tool directly. This tool contains an installed version of ASPECT, the Advanced Solver for Problems in Earth's ConvecTion, in a Linux environment. ASPECT example models and data are located in directories defined in its environment variables. For more information, see [ASPECT Virtual Desktop](#)

Contributed by: Rene Gassmoeller, University of Florida.

Notebook: Fundamentals of Solid Earth Science

Launch the interactive book, Fundamentals of Solid Earth Science, which offers an introduction to a smorgasbord of introductory topics in geophysics using the Python programming language. For more information, see [Fundamentals of Earth Science](#).
Contributed by: Pritwiraj Moulik, Princeton University.

See the complete collection of executable notebooks by navigating to [Software > Launch](#) You must be logged in to your user account to launch a tool.

Have a notebook you are interested in sharing with the community?
Please [contact us](#) to discuss creating a new resource for the community.

Governance

Nominations

Nominations are now open for this year's elections - 1 seat is open on the Executive Committee and 3 on the Science Steering Committee. We thank Alice Gabriel for her leadership on the EC and SSC members Ebru Bozdogan, Sylvain Barbot, and Emmanuel Njini (early career) for their contributions to the community. Email the Nominations Committee your nominations for these key governance positions. A candidate can be placed on the slate by the Nominating Committee or by nomination by three Member Representatives. [\[email\]](#)

Working Groups

CIG seeks to engage its community and encourage new ideas by seeking members interested in participating as a member of a current working Group or starting a new Focused Working Groups (FWG). New FWG's should address a specific topic and have a clearly defined scope e.g., workshop, white paper, benchmark, etc. A WG should define concrete outcome(s) achievable within a short time frame, < 2 years. Anyone can propose one! We look forward to your ideas in continuing the CIG community's dynamic leadership in the Earth sciences. [\[apply\]](#)

Events

CIG Webinars

CIG Monthly Webinars are the second Thursday of the month at 2P PT unless otherwise noted. Look for announcements this Fall for 2023/2024 webinars.

Workshops

Crafting Quality Research Software and Navigating Publication in Software Journals

This two-part workshop series is designed to equip researchers and developers with the skills and understanding necessary to produce robust, maintainable, and impactful research software. Part I (August 10 - online) covers elements of software development and offers insights into the process of publishing research software in leading software journals. Part II (September 9) is a limited availability, in-person hack event with help from experts for teams committed to prepare their software for submission.

Register by **August 9** for the online workshop. You must register, apply, and attend Part I to attend Part II. [\[more info\]](#)

I: August 10 Zoom

II: September 9 Palm Springs, California

See our [calendar](#) for details on all events and registration.

Remember to join our [forum](#) to receive announcements for these and other 2023-2024 events.

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