

Open thermochronology

An initiative for open-source, community-led thermochronology software and resources

Thanks for joining us. We'll get started at 9:00

Who are we?

(Session hosts introduced themselves...)

Who is Open Thermochronology?

The core team

- **Willy Guenther**, University of Illinois, USA
- **Brenhin Keller**, Dartmouth College, USA
- **Kalin McDannell**, Gradient & Dartmouth College, USA

- **Dave Whipp**, University of Helsinki, Finland

Why open thermochronology?

Researchers are currently embracing **open science** to ensure research results are (1) accessible, (2) reproducible, and (3) shared with a broad audience.

- **Software** is a key piece of open science both in the **production of results** and **training of new researchers**.
- Many **publishers aim to support open science**, asking authors to **provide all data and software** needed to reproduce the results in a manuscript (e.g., AGU journals require this - see <https://www.agu.org/publications/authors/journals/data-software-for-authors#needed>).

Why open thermochronology?

We have several well established software packages used in the thermochronology community but...

- The most popular software packages are **not open source**
 - Researchers cannot see how calculations are done, teachers cannot show students how things work “under the hood”
- We also **lack a common platform** for sharing and collaborating on software
 - People end up writing (and rewriting) codes to do the same things

Aims

- Provide **open-source tools and resources** for handling thermochronometer data
 - Accessible and useful to both new users and experienced programmers
- Establish **new libraries and repositories** for thermochronometer age prediction
 - For example, a repository of kinetic parameters for age prediction algorithms
- Provide tools for **plotting** and **creating data tables**, and guidelines for **data file formats**
- Provide **resources for learning** (software use, data analysis, etc.)
 - How do I choose what software to use? How does it work (theory and practice)?

Where do things stand?

OpenThermoChronology x +

github.com/OpenThermoChronology/

OpenThermoChronology

Type / to search

Overview Repositories 16 Projects Packages Teams People 8

OpenThermoChronology

Open-source codes for thermochronology and time-temperature inversion

Unfollow

Popular repositories

View as: Public

You are viewing the README and pinned repositories as a public user.

You can [create a README file](#) visible to anyone.

People

Top languages

- Julia
- C++
- Python
- Fortran
- Jupyter Notebook

Thermochron.jl

Public

Open-source time-Temperature inversion of thermochronometric data

Julia 12

PyThermo

Public

Python tools for performing computational tasks in the field of low-temperature thermochronology.

Python 8 1

QTQtPlot

Public

Takes the raw time-temperature (t-T) output file from the QTQt thermal history modelling software of Gallagher (2012) and replots the output as an image displaying t-T path density.

Jupyter Notebook 4

EmpiricalBayes

Public

Uses of a form of Empirical Bayes resampling (also known as Hierarchical Bayes) for more robust (U-Th)/He data uncertainty estimation for use in time-temperature history inversions.

Jupyter Notebook 2

Arvert

Public

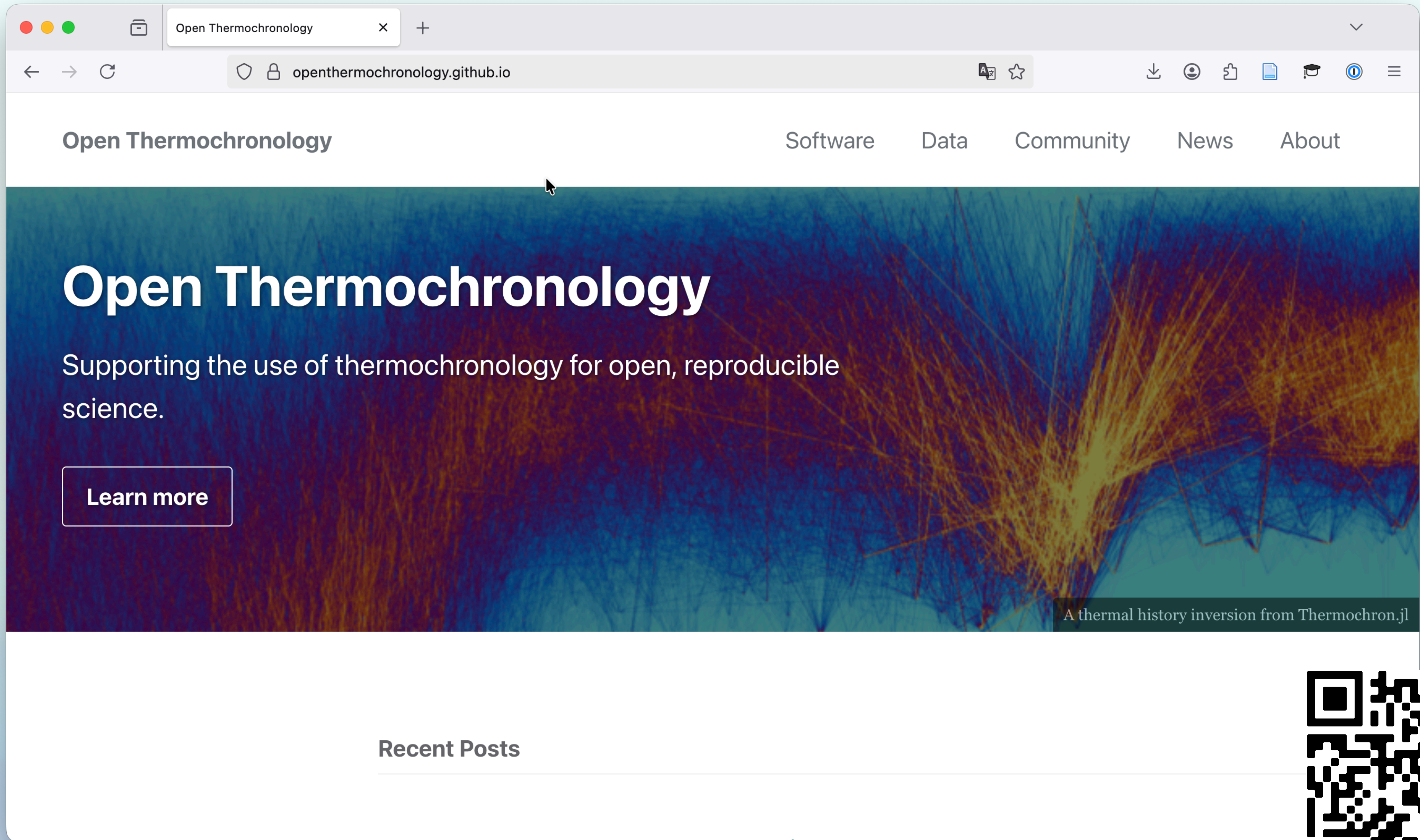
Inversion of $^{40}\text{Ar}/^{39}\text{Ar}$ age spectra and associated mineral ages for

domains

Public

Code for determining K-feldspar $^{40}\text{Ar}/^{39}\text{Ar}$ diffusion domain structure

<https://github.com/OpenThermoChronology>



Open Thermochronology

Software

Data

Community

News

About

Open Thermochronology

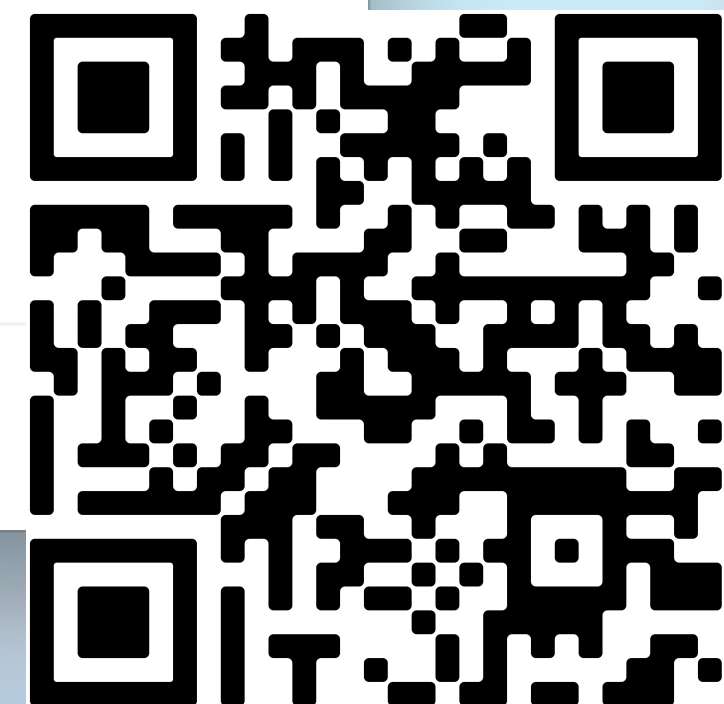
Supporting the use of thermochronology for open, reproducible science.

[Learn more](#)

A thermal history inversion from Thermochron.jl

Recent Posts

<https://openthermochronology.github.io>



What are the plans?

Currently we have started **advertising** about this initiative, **providing general information**, and **encouraging people** to get involved

We are planning info sessions at large geoscience conferences this year

- **EGU, GSA, AGU**

This is in preparation for a half- to full-day **workshop at Thermo2027** in Banff, Canada

Geodynamics - Home x +

geodynamics.org

CIG COMPUTATIONAL INFRASTRUCTURE for GEODYNAMICS


Forum Software Community Outreach Resources About Us Calendar

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Computational Infrastructure for Geodynamics (CIG)

Community-driven organization advancing Earth science by providing the infrastructure for the development and dissemination of software for geophysics and related fields.



Webinar

Exploring Thermodynamic Computational Models in Geodynamics

May 11, 8A-noon PDT • [more info](#)

<https://geodynamics.org>

CIG website

- **Discussion forum** - Low threshold to ask for help
- **Software** - List of available software, licensing info, how to contribute
- **Community** - Forum + info about how the group is organized
- **Outreach** - Newsletter, webinars, workshops, educational resources
- **Resources** - Tutorials, YouTube content, funding opportunities
- **About us** - Aims, policies, contact info, FAQs

<https://geodynamics.org>

CSDMS
community surface dynamics modeling system

Community ▾
Models ▾
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Explore Earth's surface with community software

https://csdms.colorado.edu/wiki/Main_Page

CSDMS website

- **Community** - Working groups, form for joining, publications, jobs, discussion forum
- **Models** - Software repository, how to contribute, etc.
- **Education** - Webinars, lab exercises, movies, learning modules, lectures, etc.
- **Products** - CSDMS data products, “CSDMS workbench”, their GitHub, etc.
- **Services** - Proposal support, visiting scientist application, computing infrastructure
- **About** - Overview, awards they give, code of conduct, how to cite, contact info

https://csdms.colorado.edu/wiki/Main_Page

We are interested in hearing your ideas

- What would you like to see Open Thermochronology do?
- What is the community currently missing?

We are interested in hearing your ideas

- What are some of the things that limit your ability to interpret your data?
- What kinds of training would be beneficial?

We are interested in hearing your ideas

- How should activities be arranged? (In person, virtual, webinars, videos online, etc.)

How do I get involved?

You can use the e-form at <https://elomake.helsinki.fi/lomakkeet/136309/lomake.html> to share your contact information

- We will only use your email address to share information directly related to Open Thermochronology (meetings, activities, etc.)

We particularly would like to encourage **early career researchers** to get involved!



Share your contact info!