Welcome to Ximera

August 13, 2025

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Part I

Home

Welcome

Ximera provides the technology and community support for free and open mathematics education materials. Built with the support of instructors and faculty from multiple institutions, the project supports open educational resources (OER), curates existing resources, and builds the technology that enables instructors to take control of assessment.

All content is created in LaTeX and published as a traditional PDF and as an online interactive document.

The LaTeX-code of a Ximera course is stored in Git, and can be build and published from github.

Remark 1. Go directly to the content published on this Ximera server.

Author(s):

Demo

Not yet.

Author(s):

Part II

Courses

Courses

Ximera provides free interactive online content. Anyone with an internet connection can freely learn and interact with our materials, without even logging in!

Selected Ximera Courses

Here are some of the interactive textbooks and activities available through Ximera:

- Precalculus Algebra
- Comprehensive Factoring Practice Quiz
- Precalculus with Review: Part I
- Precalculus with Review: Part II
- Business Calculus
- Calculus 1
- Calculus 2
- Calculus 3
- Linear Algebra: An Interactive Introduction
- Differential Equations: An Interactive Introduction
- Systems: Number of Solutions (with Parameter)
- Math for Elementary Teachers: Part I
- Math for Elementary Teachers: Part II
- Quality Control for Introductory Statistics and Manufacturing Courses

There are new courses being built using Ximera all the time—check back soon!

Author(s):

Part III
Documentation
For students

Typically Ximera courses are free. Students can use any of the materials they find, even if not enrolled in a course.

Author(s):

For authors

An author of Ximera material just writes LaTeX code. Each webpage is generated from a LaTeX document with documentclass `ximera`, which is an extension of article that defines some extra commands and environments that e.g. generated interactive anwser boxes.

A course is just a collection of webpages, and is created as a LaTeX document of documentclass `xourse`.

More info is found on github, especially in the ximeraFirstSteps repository that lets you start building and publishing a course right from within your browser. The only thing you need to get started is a free github account.

An integration with Overleaf is possible, and will be documented soon. Of course you can also work locally on your own PC if you prefer.

There is a PDF manual, written in Ximera and thus also available online, and on the (legacy) OSU Ximera Server.

Author(s):

For institutions

The main providers of Ximera courses are

- The Ohio State University
- University of Florida
- KU Leuven

Following institutions use or develop material in Ximera:

- California State University, Sacramento
- Coastal Carolina University
- Columbus State Community College
- Embry-Riddle Aeronautical University
- Lakeland Community College
- Ohio Dominican University
- Shoreline Community College
- University of Cincinnati
- University of Connecticut

Author(s):

For developers

Ximera is maintained by a community of people. The lead developers are:

- Bart Snapp (Project Manager and LATEX Development)
- Jim Fowler (Frontend/Backend Development)
- Jason Nowell (Answer-type/LATEX Development)
- Wim Obbels (DevOps: Frontend/LATEX/Deployment Development)
- Jeff Kuan (Accessibility Specialist)

Contributions are appreciated: consider applying for a Ximera Flash-Grant Stipend

Author(s):

Accessibility

Accessibility and WCAG 2.1 AA Compliance

Ximera strives to be compliant with the Web Content Accessibility Guidelines (WCAG) 2.1 AA standard, as required by the United States Department of Education. These are the technical standards that will be required of public colleges and universities in April 2026, according to the Department of Justice's interpretation of Title II of the Americans with Disabilities Act. We are currently partnering with Tailor Swift Bots LLC to ensure that our content meets these standards.

Of course, meeting a technical standard does not imply that content will be accessible to every user with a disability. It is important that instructors include an accessibility statement for their students. Depending on the institution's organization, the contact person may be the disability resources office, an instructional designer, or even another faculty member. If you wish to verify that your course meets WCAG 2.1 AA, you may email Jeffrey Kuan, who can use a variety of screen readers and automatic accessibility checkers. **Do NOT claim that your course is WCAG 2.1 AA compliant without a manual human verification.**

Current features

MathJax is supported in Ximera. Webpages created with Ximera will have the mathematical content displayed in MathJax, which can be read with EquatIO. In principle, the webpage can be edited so that screen readers like NVDA, JAWS, VoiceOver and Narrator can read it directly. We would recommend checking if your institution licenses EquatIO for your students.

Lists can be compliant in Ximera. Using `itemize`, `enumerate`, and `description` environments in LaTeX will correctly create unordered, ordered, and description lists (respectively) in HTML. We do not offer custom list labeling, although labels can be modified in the CSS file (this will be done later). The references list will be displayed as a description list, which is the recommendation of the DAISY consortium.

Desmos and Geogebra have accessibility features. Ximera is able to embed both Desmos and Geogebra and support their accessibility features.

Author(s):

Upcoming features

MathML 4.0 will be supported. As of the current date (June 25, 2025), we are still waiting for the final release of MathML 4.0, which is planned for August 2025. One notable feature will be the "intent" environment, which allows the author to insert their intended text-to-speech for math symbols. For example:

```
a(b+c) = ab + ac
```

can be read as "a times the quantity b plus c equals a b plus a c" rather than "a left paren b plus c right paren equals ab plus ac." Historically, this would be called "alternative text"; for a variety of reasons, that terminology is somewhat outdated. We will add a LaTeX command or environment, probably called `intent`, that will insert the author's intended text-to-speech in the webpage.

Tables will need to have headers and scopes from the LaTeX code. This will soon be implemented with the LaTeX package `tabularray`.

Headers are required for environments. The `problem`, `exercise`, and `question` environments will need to have appropriate headers; same with theorem, proposition, etc.

Answer will need to be supported. In the future, screen readers will be able to inform readers if their answers are correct or incorrect.

Navigation will be improved. We will work with experts at Ohio State University who have worked on the navigability of webpages.

Part IV
About Ximera
History

Not yet.

Author(s):

Demo

Ximera workshops are true **working** workshops where users and developers at all levels of experience come together to create something new.

Past workshops

Ximera Workshop 10 (5/12/2025–5/14/2025)

Location: Ohio State University, Columbus, Ohio
Dates: May 12–14, 2025
Presentations: Cockins Hall 240 (CH 240)
Workgroups: CH 240 and Math Tower 724 (MW 724)

The Ximera Workshop 10 was a hands-on, collaborative event bringing together creators, educators, and developers to improve and expand the Ximera platform. We spent our mornings learning and discussing major topics, and our afternoons working together to build content, prototype tools, and draft new resources.

Daily Schedule

Monday, May 12:

- **9:00–9:30** Arrival (CH 240)
- **9:30–10:20** *Introduction to Ximera* – Snapp (OSU)
- **10:20–10:30** Break
- **10:30–11:20** *Deploying in Ximera* – Obbels (KU Leuven)
- **11:20–11:30** Break
- **11:30–12:20** *Modulus Demo* – Infonomic
- **12:20–12:30** Organize Lunch
- **12:30–2:00** Lunch (in groups)
- **2:00–3:20** Working Groups (MW 724)
- **3:20–3:30** Break
- **3:30–4:30** Wrap-up

Author(s):

Tuesday, May 13:

- **9:00–9:30** Arrival (CH 240)
- **9:30–10:20** *Advanced Validators* – Nowell (UF)
- **10:20–10:30** Break
- **10:30–11:20** *Desmos* – Kuczmarski (Shoreline Community College), Davis (OSU), Guindon (Desmos)
- **11:20–11:30** Break
- **11:30–12:20** *Server* – Fowler (OSU)
- **12:20–12:30** Organize Lunch
- **12:30–2:00** Lunch (in groups)
- **2:00–3:20** Working Groups (CH 240)
- **3:20–3:30** Break
- **3:30–4:30** Wrap-up

Wednesday, May 14:

- **9:00–9:30** Arrival (CH 240)
- **9:30–10:20** *Accessibility* – Kuan (OSU/TailorSwiftBot) (captions were manually checked and the transcript can be downloaded)
- **10:20–10:30** Break
- **10:30–11:20** *Interactive Elements and Ximera* – Findell and Davis (OSU)
- **11:20–11:30** Break
- **11:30–12:20** *Next Steps and Discussion*
- **12:20–12:30** Organize Lunch
- **12:30–2:00** Lunch (in groups)
- **2:00–3:20** Working Groups (MW 724)
- **3:20–3:30** Break
- **3:30–4:30** Wrap-up

Workshop Goals:

- All participants **deploying Ximera content** to local and remote servers

- Finalize a new edition of the **Ximera User Manual**
- Merge LuaXake with the master branch of Ximera LaTeX
- Submit updated LaTeX materials to **CTAN**
- Begin to develop **LTI 1.3 integration** at OSU and beyond
- Prototype a new **customizable, accessible server**
- Draft **Calculus translations** in Portuguese and Spanish

Ximera Workshop 9

The Ximera Workshop 9 was a virtual workshop (Ximera Virtual Workshop 1) held spring of 2024. We had 5 participants. Major accomplishments included: The Ximera document class was submitted to CTAN.

Ximera Workshop 8

The Ximera Workshop 8 was held spring of 2019 in Columbus Ohio at Ohio State University. We had around 10 participants. All participants were deploying with Xake by the end of the workshop.

Ximera Workshop 7

The Ximera Workshop 7 was held fall of 2018 in Columbus Ohio at Columbus State Community College. We had around 10 participants. All participants were deploying with Xake by the end of the workshop.

Ximera Workshop 6

The Ximera Workshop 6 was held fall of 2018 in Gainesville Florida at the University of Florida. We had around 15 participants. All participants were deploying with Xake by the end of the workshop.

Ximera Workshop 5

The Ximera Workshop 5 was held summer of 2018 in Columbus Ohio. Major accomplishments included: Major rewrites of Xake; major rewrite of the Ximera LaTeX document class; documentation for LTI support.

Ximera Workshop 4

The Ximera Workshop 4 was held summer of 2017 in Columbus Ohio. Major accomplishments included: Documentation was rewritten; directions for deploying from different machines; LTI support.

Ximera Workshop 3

The Ximera Workshop 3 was held summer of 2016 in Columbus Ohio. It was funded by NSF Grant DUE-1245433. Major accomplishments included: Xake was developed; Sage integration; Desmos integration.

Ximera Workshop 2

The Ximera Workshop 2 was held summer of 2015 in Columbus Ohio. It was funded by NSF Grant DUE-1245433. Major accomplishments included: Multimedia integration; GeoGebra integration; and the Xourse document class was developed.

Ximera Workshop 1

The Ximera Workshop 1 was held summer of 2014 in Columbus Ohio. It was funded by NSF Grant DUE-1245433 and a Shuttleworth Flash Grant. Major accomplishments included: The basis of the documentation found here; the first standardized method for deploying was developed; and the Ximera document class was drafted.

Funding

The Ximera Project is funded 2024-2026 (with no other external funding) by a $2,125,000$ Open Textbooks Pilot Program grant. In the past, the Ximera Project has also received support from NSF Grant DUE-1245433, the Shuttleworth Foundation, the Ohio State University Department of Mathematics, and the Affordable Learning Exchange at OSU.

Also KU Leuven and University of Florida contributed to the technical development of Ximera.

Author(s):

Partners

To be added.

Author(s):