

Paul Halsall

From the Web to AI: Two Disruptions in Access to Medieval Sources

[was From the First Medieval Websites to AI: Thirty Years of Changing Access to the Past]

International Medieval Congress, Leeds 7th July 2026

Paper ID# 16997: From the First Medieval Websites to AI: Thirty Years of Changing Access to the Past

Session Title: From the Web to AI: New Digital Access to Medieval Sources

SLIDE: Douglas Adams quotation

1. Introduction: the world wide web as the first disruption

SLIDE: 1. The world wide web as the first disruption

I will begin, not with AI now, but with the world wide web in 1995.

The comparison is essential - what we are now experiencing with AI is not the first technological disruption in access to medieval sources that I have lived through.

In the mid-1990s, the world wide web altered what was possible. It changed what medieval sources could be found and be given to students, and most dramatically what a teacher working without large institutional resources could use in class.

I am not here going to offer a technical account of AI, nor to present myself as an expert in machine learning. I am not one. I am speaking rather as a medieval historian who has spent more than thirty years thinking about computers, access, and scholarly mediation. And as someone who created the Internet Medieval Sourcebook, one of the earlier large-scale medieval teaching web resources. I am here addressing what it means to have lived through one major transformation in access to sources and now to find myself in the middle of another and more profound one.

If the web was the first transformation. The second, I want to suggest, is occurring now and is AI: not because every claim made for AI is true, but because AI is beginning to change the relationship between digitised material and usable knowledge.

I have been speaking publicly about the internet and medieval studies since I first gave a talk entitled “The Internet for Humanists” to other medieval students at Fordham in early 1993. And by the mid-1990s I was already treating the internet as something of real consequence for medieval

scholarship, for example through online library catalogues. By 1995, the internet was no longer a curiosity for me. It had become part of how I thought about the future of scholarly access.

SLIDE: Gopher and MELVYL

But my “ding moment” came when I first saw a web browser. I already used computers, email, file transfer, gopher, and telnet for online library catalogs, but the early graphical web browser made something newly visible and changed everything to me. It was not simply another tool, but a different infrastructure for scholarly dissemination. Mosaic appeared in 1993, Netscape followed in 1994. But in mid 1995, while adjuncting at Brooklyn College, I first saw Netscape 1.2. and with its use of backgrounds and early visual formatting, I was struck that this would matter enormously.

SLIDE: Brooklyn College Labs

SLIDE: Netscape Navigator

SLIDE: My Use of Backgrounds

That led quite directly to the Internet Medieval Sourcebook, which I put online in January 1996. The Medieval Sourcebook later became part of the larger Internet History Sourcebooks Project, but at the beginning it was a practical response to a simple problem. Teachers needed access to primary source materials that could easily be assigned to students (even if in printed out form). Many e-texts existed, but they were scattered or locked into formats and locations that made them hard to use in ordinary teaching. Once the web made distribution possible at scale, as a historian who cared about access, I could begin building something that did not previously exist.

SLIDE: Internet Medieval Sourcebook

This was never merely “putting texts online.” The Sourcebooks were never only a heap of files. They involved selection, correction, editing, navigation pages and continuous maintenance. The work was technical, but it was also interpretive. To choose texts, contextualise them, and make

them usable for teaching is an act of scholarly mediation. Not neutral clerical labour, but a way of shaping access to the past.

The Internet Medieval Sourcebook belongs to the first generation of web “digital humanities” (not a phrase most of us would have used at the time). The work was not glamorous: early OCR, scanning, proofreading, hand-built HTML, and repetitive maintenance. It rested on a conviction that access mattered, and that a relatively simple web infrastructure could make historical sources available on a scale that had previously been difficult to imagine.

One of the lessons of that first disruption is that simple structures can endure. The early web was fragile in unanticipated ways. Ephemerality especially was a problem. Links broke. Servers disappeared. Projects were abandoned. Content management systems kept appearing and disappearing. Yet some of the simplest, most static, text-heavy forms of web publication have aged surprisingly well. In some cases, they have proved more durable than more fashionable or more complex digital systems. A plain HTML file, if preserved, migrated, backed up, and kept addressable, can outlive several generations of institutional redesign.

2. The web changed access, but at a manageable pace

SLIDE: 2. The web changed access, but at a manageable pace

The web of the mid 1990s was disruptive, but for a long time it remained recognisably an internet of websites, as opposed to the “platform internet” we have now. One could learn HTML, website construction and FTP, and those skills would remain usable for years. The tools changed, but not usually overnight. There was time to develop competence, build habits, and adapt.

This is one way in which the IMC theme of Temporalities helps me think about the comparison. The web had a temporality one could learn to live with. It changed scholarly work, but it did so at a speed that allowed us to acquire techniques, make mistakes, repair them, and carry

those habits forward. The difference with AI is that the pace and character of development are different.

SLIDE: WordPerfect / boxed software / older technological friction

WordPerfect 5.1 is a useful example of that older technological temporality. It was released in 1989 and remained central for many users well into the late 1990s. Software moved forward, but it did not feel as though an entire intellectual workflow was being reconfigured every few months. I was able to maintain the Sourcebooks almost entirely by hand-coding (with TxtPad) until circa. 2009.

As with AI now, the early web generated anxieties — David F. Noble’s 1997 ‘Digital Diploma Mills’ warned of expropriation and commercialisation, and much of what he predicted has happened — but the web also had real advantages and proved unstoppable.

The web became a mixed environment: commercial and non-commercial, scholarly and trivial, liberating and exploitative, durable and ephemeral. Medievalists learned to use it, complain about it, contribute to it, and, crucially, to depend on it.

The web also trained its users, as all technologies since the invention of writing train their users. A database trains one to think in records, fields, and categories. A word processor trains one to think in files, pages, revisions, and styles. Hand-built HTML trained users to think about links, paths, filenames, servers, broken images, and dependence on other people’s machines. It taught me early on that something could work today and still be a bad structure for the future, but also that something could look crude and yet prove durable.

AI is beginning to train users in a comparable way. It brings with it a vocabulary of “prompts”, “workflows”, “friction”, “iteration”, and even the very useful “red-teaming”. Some of that language can feel alien, as though it belongs to software development or management rather than to

scholarship. But tools have always carried habits of mind with them. The question is whether we can become conscious of them quickly enough to use them critically.

That manageable pace of change is precisely what has not reproduced itself with AI — and the difference matters for how we think about the second disruption.

3. AI as a faster second disruption

SLIDE: 3. AI as a faster second disruption

Public access to large language models became widely visible with ChatGPT in November 2022, though the technical “prehistory” goes back earlier (to 2017 and the Transformers paper). Since then, development has been extremely rapid. In three and a half years, scholars in many fields have begun asking whether their actual workflows are being altered.

SLIDE: AI ding moment

My own AI “ding” moment came earlier this year, although the process began earlier. I had been experimenting with AI since late 2022, especially in relation to translation from medieval Greek and transcription from manuscripts. Translation from medieval Greek is close to my own expertise. Manuscript transcription is not something I have done but it is part of the broader training and world of medieval studies.

As part of my dissertation, I translated the Greek *vita* of St Thomais of Lesbos. That translation took a long time, and I needed the intervention and judgement of Alice-Mary Talbot, one of my outside dissertation advisers. What struck me, when I first tested AI on the same kind of material, was not that it produced a perfect translation. It did not. The striking thing was that it could produce, in minutes, a plausible rough translation of a kind that would once have taken me months to assemble as a working basis. That does not abolish the need for expertise. Quite the

reverse. A rough AI translation still requires checking, correction, judgement, and knowledge of genre, theology, syntax, and historical context. But the point at which the human scholar enters the process may shift. Instead of beginning with a blank page and a lexicon, one may begin with a draft that has to be interrogated.

Even more striking was what happened this year when I asked the system to identify possible echoes of the Septuagint Psalms in the *vita*. Medieval Greek religious texts were often written by people who prayed the Psalms constantly. Their language is saturated with scriptural phrasing. I do not have the Greek Psalms in my mind in that way. With the Life of St. Thomaïs, AI, however imperfectly, because it has instant recall of the entire corpora of Greek biblical texts, identified patterns and possible allusions that I would then need to verify. That ability in intertextual recognition, and the speed it does it, changes how I can deal with texts.

HANDOUT 1: Life of St Thomaïs, 1999 and 2026

Transcription raises a related but distinct issue. I do not want to claim more than I know. In my own tests with a late medieval Book of Hours and a necrological list, ChatGPT gave more plausible rough readings than out-of-the-box Transkribus and improved noticeably between February and May 2026, even while remaining unreliable on local names. When general tools become more convenient, more widely available, and good enough for preliminary work, specialist applications may find themselves leapfrogged. There is a history of this—MS Defender making other anti-virus software obsolete for most users. A similar leapfrogging may occur quite quickly with transcription software.

The most important point here is that technology need not be flawless to become consequential. The reasonable comparator is not with perfection. Early web access in 1996 was often slow and links rotted; yet teaching was transformed. Present AI is often wrong, and sometimes overconfident,

yet since January I think it has crossed into a stage where scholars have no choice but to think about how to use, resist, verify, and shape it. The disruption is here and now.

And AI is speeding up – consider the rate at which new frontier models are being released, and from many companies in the US, China, and the rest of the world.

Handout 2: Release of new Frontier Models

This is not only a medievalist anxiety. Programmers, lawyers, translators, teachers, and even mathematicians are also trying to understand what these systems can and cannot do. That matters, because it prevents us from imagining that medievalists are uniquely unsettled because our field is old, text-based, conservative, or fragile. The point is not that AI has solved expert problems. The point is that experts cannot ignore it.

SLIDE: New Scientist on AI and Maths

4. From access to processability

SLIDE: 4. From access to processability

The reason this matters for medievalists specifically is that it changes where the difficulty lies.

For much of the history of medieval studies, the bottleneck was access. Could one get to the manuscript? Could one obtain the edition? Could one find the printed volume? Could one photograph it, photocopy it, borrow it, or travel to it? The first waves of digitisation altered that **bottleneck** by making images, catalogues, editions, and PDFs more accessible. But many of those digital objects remained stubbornly resistant to analysis. They were visible, but not always searchable. Searchable, but not always accurate. Digitised, but not structured. Online, but not computationally usable.

AI and adjacent machine-learning tools operate precisely in that space. They can reprocess existing digital material: extracting text from images, identifying names, suggesting dates, roughly translate passages, creating working summaries, and converting one form of digital object into another. The resources created in the first wave of web digitisation can therefore become raw material for a second phase.

That is an important shift. The first web disruption made sources available to people. The second may make sources available both to people and to machines that will then shape what future people can ask and find. There is a feedback loop here. AI-mediated access to the past becomes the raw material for the next generation of AI competence about the past.

SLIDE: Old bibliographical methods vs new

SLIDE: Bottleneck change with Cuneiform

I'm going to venture outside the field of medieval studies to indicate what this change of bottleneck means. Consider the cuneiform bottleneck in Ancient Near Eastern studies. Hundreds of thousands of tablets exist, but fluent Akkadian readers are rare. The texts are repetitive business records. AI can scan and transcribe them, unlocking massive economic datasets. Statistical tools will transform our understanding of economies. I use this example because the audience has no investment in Akkadian, unlike medieval Latin or vernaculars.

SLIDE: CoMMA / manuscript transcription at scale

Since this session was proposed, the pace of change has itself become part of the evidence for my paper. In January, CoMMA, the Corpus of Multilingual Medieval Archives reported the transcription of 32,763 digitised manuscripts in four months. That number matters, but the number alone is not the argument. What matters is the change in scale and the new kind of question it creates. If a project reports a 9.7 percent error rate based on manual checking of short samples in hundreds of manuscripts, the scholarly problem is no longer simply whether such transcription is

possible, because it will get better very rapidly. It is how the error rate was sampled, what kinds of errors are being counted, how errors are distributed across scripts, languages, abbreviations, and page conditions, and what forms of human verification are adequate for different kinds of scholarly use.

SLIDE: Jim O'Donnell / SourceLibrary / The future is here

An even more recent sign of movement is SourceLibrary, associated with the Bibliotheca Philosophica Hermetica. The classicist James O'Donnell, at the forefront of web use for late antique texts since the 1990s, posted on Facebook about this recently with the statement “the future is now”. For this paper, however, its significance is that it presents a serious text collection as something to be read by human beings and also as something shaped by and for AI-mediated access. It is a reminder that the future imagined by such projects is not simply a larger digital library. It is a library in which the machine is part of the reading environment.

The proper comparator for AI transcription, translation, or data extraction is therefore not perfection. It is actual human work. Human beings mistranscribe, misread, mistranslate, skip lines, misunderstand abbreviations, impose expectations, get tired, and make inconsistent decisions. Human labour is expensive, slow, uneven, and often unavailable. AI error is real and sometimes dangerous, but human error is also real. The question is not whether AI is flawless. The question is what kind of error it introduces, at what scale, under what conditions, and with what possibilities for detection and correction.

This is where expertise still matters, though perhaps not always in the same place in the workflow. If a model can produce a rough translation, identify possible biblical echoes, transcribe at scale, summarise a long text, or classify catalogue data, the human scholar does not disappear. But the scholar's work changes. Expertise moves toward verification, correction, sampling, source

criticism, interpretation, and methodological judgement: knowing when the machine is probably right, plausibly wrong, or giving a seductive answer to the wrong question.

5. Expertise, friction, and scholarly judgement

SLIDE: 5. Expertise, friction, and scholarly judgement

I would therefore describe my own position as one of conservative openness to new technology. I do not think refusal is a serious scholarly strategy. I have seen enough technological change to know that new systems always arrive with promises, distortions and real costs. The web expanded access, but it also created ephemerality, link rot, platform dependence, search degradation, and new forms of commercial capture. AI will do the same in its own ways.

But there is also no special scholarly virtue in mechanical struggle as such. There is virtue in thought, judgement, accuracy, care, and responsibility. But there is no moral superiority in spending hours doing a task badly if a machine can help produce a better starting point.

SLIDE: Carrying books to photocopier

In the 1990s, much of my work involved physical and mechanical labour: carrying books, photocopying, typing, building bibliographies, correcting OCR, creating HTML pages, and moving material from one format into another. Some of that labour taught me the material. Some of it was simply friction.

AI can reduce certain kinds of friction. It can help turn messy notes into paragraphs, organise thoughts spoken aloud, suggest structure, and produce a draft that one then rejects, rewrites, or quarrels with. That is not the same as having AI “write the paper.” At least in my own practice, the originating questions, examples, judgements, and arguments remain mine.

The danger is obvious. AI can flatten style and make prose sound more confident than the thought behind it. The answer is to develop habits of use in which AI drafts remain subordinate to human judgement, and in which the scholar remains responsible for the final text.

There is a further paradox here. Those best placed to use AI critically may be those who acquired many of the relevant skills before AI became available, while students now risk using AI in ways that may prevent them from developing precisely the judgement needed to evaluate it. I do not have a solution to that problem in this paper, but I think it is one of the educational questions that follows from the technological one.

SLIDE: Bottleneck changing to abundance

The broader challenge, then, is abundance. The first web disruption addressed scarcity. It made sources available. It helped students and teachers reach texts that would otherwise have been difficult to obtain. The second disruption may intensify abundance to the point where access itself is no longer the primary problem. Instead, the problem becomes correction of errors and analysis of mass material.

When tens of thousands of manuscripts can be transcribed in weeks, if books and secondary literature can be translated with reasonable accuracy, if OCR can be corrected, if names and places can be extracted, then the scholar faces a changed landscape. The difficulty is not simply finding material. It is knowing what kind of material one has found, how it was processed, what errors entered it, what was omitted or normalised, and what interpretive frame has been silently imposed.

A digitised manuscript image is not the same as a transcription. A transcription is not the same as an edition. An edition is not the same as a translation. A translation is not the same as interpretation. A searchable corpus is not the same as understanding. Each stage adds possibility, but each stage also adds mediation. Some have suggested that AI is an emperor without clothes, but I just don't think we can put our heads in the sand and pretend it's not there or that we can avoid it.

Conclusion

My conclusions are provisional. The field is moving too quickly for any confident final judgement. But I think I can say this much.

AI has already produced a second disruption, not by replacing the web, but by acting upon the digital abundance the web and digitisation created. It can reprocess, restructure, translate, transcribe, classify, and summarise material that was already online but not fully usable.

Second, the pace is different. The web changed quickly, but it gave us time to master many of its basic forms. AI is changing faster, and its capacities are moving across domains in ways that make stable expertise harder to define.

Third, the central scholarly problem may be shifting from access to verification, interpretation, and navigation. We are not leaving source criticism behind. We are entering a situation in which source criticism has to include the digital and computational processes through which sources reach us.

The task is neither to celebrate nor to refuse. The task is to understand, test, correct, preserve, and shape. That is what medievalists already know how to do with difficult inheritances from the past. We now have to do it with the tools that are changing how that past becomes accessible.

I should add that this paper has itself been prepared with AI assistance. I have used ChatGPT, Claude, and other AI systems to organise notes, correct grammar, test formulations, red-team objections, and challenge the argument. I do not regard the paper as AI-written. The examples, judgements, and conclusions are mine. But the process of preparing it has itself become one of my examples of the changed scholarly workflow I have been describing.

Paul Halsall

From the Web to AI: Two Disruptions in Access to Medieval Sources

[was *From the First Medieval Websites to AI: Thirty Years of Changing Access to the Past*]

International Medieval Congress, Leeds 7th July 2026

Initial Abstract: This paper reflects on thirty years of creating and editing the Internet Medieval Sourcebook, from its origins in the early web era—when Mosaic and early Netscape browsers first revealed new possibilities for scholarly dissemination—to the present moment of experimentation with generative AI. Rather than offering technical expertise, the paper provides a historian’s perspective on AI as a research and interpretive tool, shaped by recent practical experiments. The presentation considers continuity, preservation, and change in digital medieval studies, offering a provisional assessment appropriate to a rapidly evolving field.

Session Summary: Over the past three decades the internet has transformed access to medieval sources. Digitisation projects, online catalogues, and large-scale digital text collections have made materials available to scholars and students in ways unimaginable in the early 1990s. Yet many of these resources remain constrained by the formats in which they were first created: scanned PDFs, imperfect OCR, and catalogues designed primarily for human reading rather than computational analysis. In less than three years since the public emergence of large-scale generative AI systems such as ChatGPT, however, new tools have begun to reshape how these materials can be accessed and analysed. AI-assisted coding, improved OCR, and large language models now allow scholars to reprocess existing digital resources, extract structured data, and enable new forms of search and classification. Resources created in the first wave of web digitisation can thus be reorganised as research datasets.

In keeping with the IMC 2026 theme of Temporalities, this session reflects on a moment of rapid technological change in medieval studies. The papers examine both practical applications—such as restructuring manuscript catalogues—and broader methodological questions about whether the field is entering a new phase in which the principal challenge is no longer access to sources, but how to navigate their rapidly expanding digital abundance.

Paper ID# 16997: From the First Medieval Websites to AI: Thirty Years of Changing Access to the Past

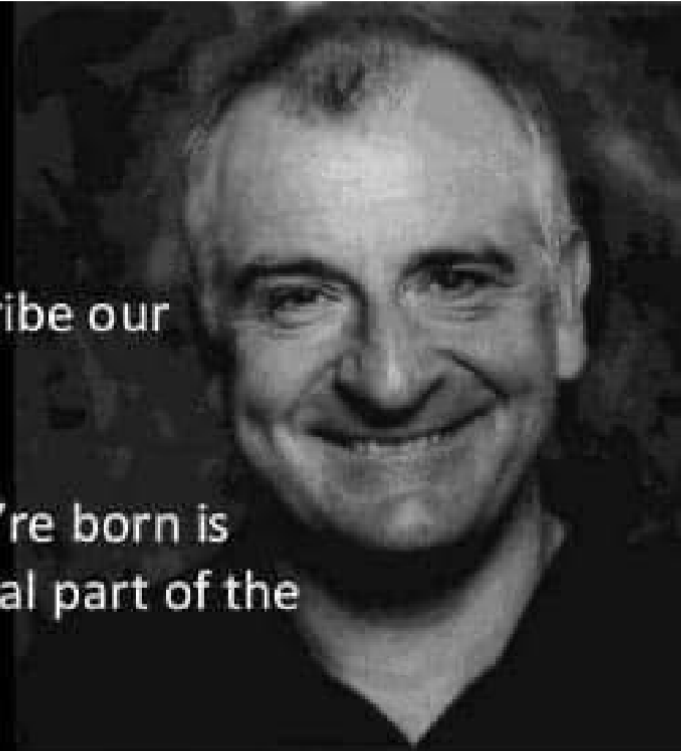
Session Title: From the Web to AI: New Digital Access to Medieval Sources

SLIDES

Douglas Adams

"I've come up with a set of rules that describe our reactions to technologies:

1. Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works.
2. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it.
3. Anything invented after you're thirty-five is against the natural order of things."



From the Web to AI

Two Disruptions in Access to Medieval Sources

Paul Halsall

International Medieval Congress, Leeds 7th July 2026

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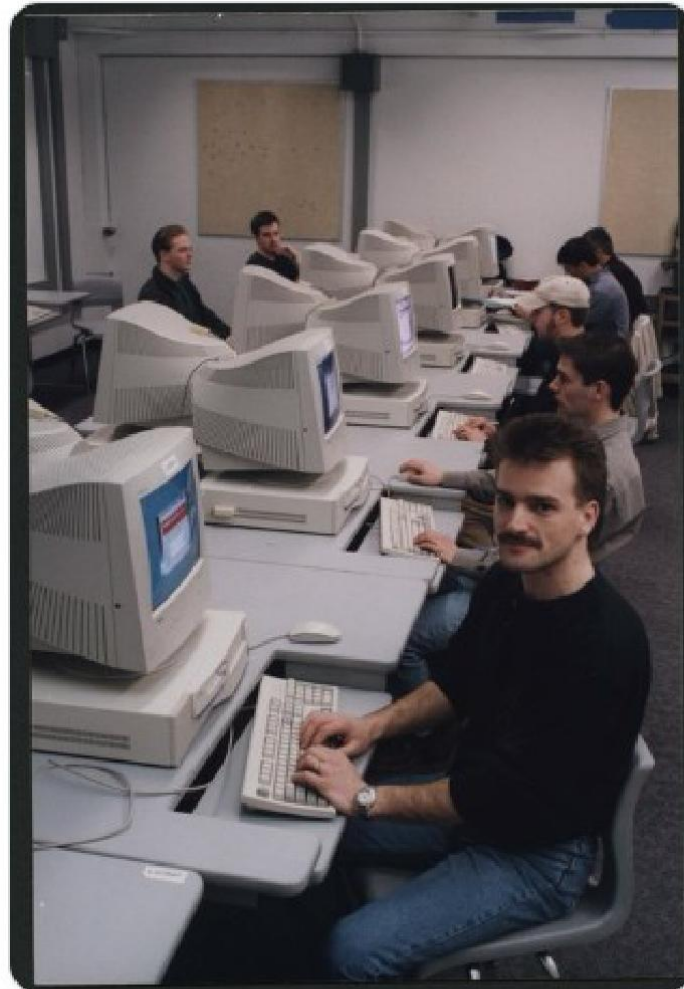
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(FILE) June 23, 2017: June 1941 uprising in eastern Herzegovina
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Medieval History Course

Medieval New York

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MODERN EUROPEAN HISTORY

RADICAL CATHOLIC PAGE

CHINESE CULTURE

Lesbian, Gay & Bisexual Catholic Handbook

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Chinese Studies Page

Radical Catholic Page

Lesbian, Gay and Bisexual Catholic Handbook

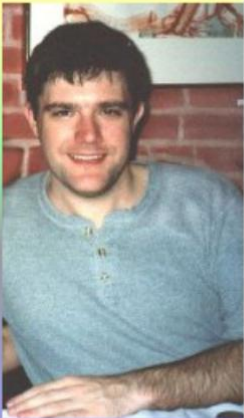
People With a History: Lesbian, Gay, Bisexual and Trans* History

Paul Halsall

Web Sites

Introduction

I have a number of distinct but interlocking interests. This "mother of all homepages" is a link to specific web sites I have prepared on these various interests. In many cases these sites are the most complete guides to the subject on the internet. With one exception [the specific [Byzantine & Medieval Links](#) site], none of these sites are lists of links, but contain unique content.



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²⁹ Cf. Eccl. 3:3.

frequenting the divine churches, they *praised the Lord seven times a day*.³⁰ And continually reading the divine scriptures, and devoting themselves to all night prayer and fasting, they entreated the Lord that a child be given to them. They emulated the supplications of the righteous Anna and Joachim, the parents of the mother of God: they frequently beat their breasts, and bathed their beds with tears.³¹ And from the Lord they heard "*Why criest thou to me?*"³² for indeed they were crying to the Lord with cries of woe and lamentations, "*Hearken to us, O God our savior; the hope of all the ends of the earth and of them that are on the sea far off.*"³³ Be the defender of those that call on you. Reveal Thyself as helpmate to our intention. Grant a fruit of the womb to Thy servants who petition Thee. Do not drive away empty-handed Thy pitiable servants who prostrate themselves before Thee." They continually uttered these and similar words to the Lord, "Let not our adversaries rejoice against us."³⁴ Let them not say "*where is their God? But our God has done in heaven and in earth whatsoever he has pleased*."³⁵ What then did the God of wonders bring about in this situation? He did not overlook their entreaty, nor disregard their lamentations. But one night, the all-immaculate and ever-virginal Virgin was seen in a dream by the wondrous woman Kale, truly good³⁶ in character and manner, and said these very words: "Do not be of sad countenance about these things, O woman, and do not be upset on account of your childlessness. In a short while you shall bear a female child, who will chase as far as possible from you all despondency, O good woman."³⁷ While nearly awake, she heard these things from the Mother of God, and waking from her sleep she said words of this sort to her husband, "*While I was asleep a divine dream came.*"³⁸ therefore I awoke and beheld my sleep was sweet to me."³⁹ And she narrated all the things that she had seen. Indeed shortly thereafter, having conceived, she brought forth a child in fulfillment of the promise of the ever-virgin maid and Mother of God. The name "Thomas" <was given> to her, a child who was born in accord with a promise, who by nature was female, but by virtue and ascetic discipline much more male than men.

³⁹ Jer. 38:26 [LXX] [= Jer. 31:26 in Vulgate, KJV, and Hebrew versions]

Βίος καὶ πολιτεία τῆς ὁσίας καὶ θαυματουργοῦ Θωμαῖδος

Greek text with English translation and highlighted Septuagint Psalm references

Note: The Greek text follows the text supplied in the prompt, including several apparent orthographic/OCR irregularities. Yellow highlighting marks direct quotations or close echoes of the Greek Psalms in the Septuagint. Psalm numbering below gives Septuagint numbering first, with common English/Hebrew numbering in parentheses. Non-Psalm biblical echoes are not systematically marked.



Greek text	English translation
4. Τούτους· ἐπὶ ἵκανον ὁ ἀπαίδειος ἐλπίει δεσμός, ὡς τοὺς τοῦ Κυρίου πάλαι προσηγορίας ἢ τῆς ἀρεκτίας πᾶσι συνέσφινγεν· ἐκλόνει τούτους πικρῶς, κατέσσευε θαμνὶδ, τὴν ψυχὴν διασπαράττει, θορυεῖ τοὺς θεοὺς νοσὶς προσδρευνόντας, παννύχους ὑμνωδίας προσμένοντας, νύκτωρ καὶ μεθ' ἡμέραν ὑμνοῦντας τὸν Κύριον· οὐδέ γὰρ σωματικῆς ἡδονῆς ἐνεκα πρὸς ὁμοζυγίαν ἐντάσσονται· σήμενον· ὅλλ' ἐρέσει παῖδος ἀγῶθου, τῆς θαυμαστῆς σῆμει Θωμαῖδος, πρὸς ἣν ὁ λόγος μᾶλλον ἐπείγεται· ὅλλ' αὖτε μικρὸν ἀναμεινάται, ὡς ἂν τὰς τῆς ἀπαγγελίας ὅπας ἐγὼι σαφῶς ἀπαγγέλλειν. Ἐποῦσιν οἱ γεννῶνται τῷ ποθῷ καμνοντες τοῦ παῖδος, ὡς πρῶτον οἱ προνοοῦν τοῦ ἑμοῦ δεσποῦ Χριστοῦ· οὐδέποτε πᾶσι τοῖς ὁ λόγος τίνος ἦν ἔλεος· ὁ θῶμος συνέχοντο, θρηνησὶ συνέπλεον ῥήματα, οὐκ ἔλπιον ἐκλυτάρωντες Θεοῦ· γονυπετοῦντες, καθυκετοῦντες, ὅλην τὴν ἡμέραν πενθοῦντες ἦσαν καὶ σκαθραλοῦντες· οὐκ εἶχον δὲ καὶ δροσιστῶν· ἐπειτα οὐκ εἶχον τὸ σπᾶν αὐτῶν παρηγορημα, τὰ τῆς Δαυιδικῆς ὁδῆς· συγχοῦς ἦσαν ἐκλόντες· <<Πολλοὶ οἱ μέσται τοῦ ἁμαρτανίου, τὸν δὲ ἐλπίοντα ἐπὶ Κυρίῳ ἔλεος καὶ ὁσίοις>> [Psalm 31:10 LXX (=32:10 Eng.)] Ναι μεντοι καὶ περιεκυκλῶσεν ἔλεος καὶ δεσμούς· οὐδ' ὅλλ' παρῶσσετο· <<Ἐπῶσκον ἡμῶν, ὁ Θεὸς ὁ σωτὴρ ἡμῶν, ἢ ἐλπίς πάντων τῶν περᾶτον τῆς γῆς καὶ τῶν ἐν θαλάσσῃ μακρῶν>> [Psalm 64:6 LXX (=65:5 Eng.)] Ἐπεβλεψε τοῖνυν ἐξ οὐρανοῦ ὁ Κύριος καὶ τοῦ στεναγμοῦ τῶν πενηθῶντων ἐπικρατοῦσεν [Psalm 101:20-21 LXX (=102:19-20 Eng.)]· καὶ τῆς ἀπαίδειος δεσμῶν ὡς ὅλλ' οὐκ εἶχον τὸ σπᾶν τοῦ ἐπικρατοῦσεν· οὐκ εἶχον τὸ σπᾶν τοῦ ἐπικρατοῦσεν· οὐκ εἶχον τὸ σπᾶν τοῦ ἐπικρατοῦσεν· καὶ γίνετο τοὺς ἐπικρατοῦσεν ἐξ ἀπαγγελίας καρπὸς ὁρατοῦ τὴν ὄντων καὶ τὴν τοῦ ἥθους καταστάτην· ὁρατοῦ ἦν εἰς δροσιστῶν ὁ καρπὸς, τὴν δὲ ψυχὴν ὁρατοῦσεν· ὅλλ' ὅσα μεν καὶ οἷα τῆς ὁσίας ἐπῶσσε· οἱ γονεὶς στερομένοιοι, φθῶσσε ὁ λόγος ἡδὴ προδυσσῶσσε.	4. For a considerable time the bond of childlessness grieved them, just as the fetter of barrenness had once pressed tightly upon the ancestors of the Lord. It shook them often, convulsed them repeatedly, and tore their soul apart, as they continually waited in the divine churches, remained for all-night hymn-singing, and praised the Lord by night and by day. For they did not turn to married union for the sake of bodily pleasure — no indeed — but out of desire for a good child, I mean the wondrous Thomais, toward whom the discourse is hastening. But let it wait a little, so that it may first recount clearly how the story stands. The noble pair suffered, worn down by longing for the child, as once did the ancestors of my Master Christ. You surely know at whom the discourse hints. They were held fast by despondency, wove together mournful words, and did not cease imploring God. Falling on their knees and entreating him, they spent the whole day mourning and downcast. They did not know what they could do, since they did not have their own consolation. Often they chanted the words of the Davidic song: “Many are the scourges of the sinner, but mercy will encircle the one who hopes in the Lord.” [Psalm 31:10 LXX (=32:10 Eng.)] And indeed mercy did encircle them, and he did not at all thrust aside those who were asking: “Hear us, O God our Saviour, the hope of all the ends of the earth and of those far away at sea.” [Psalm 64:6 LXX (=65:5 Eng.)] Therefore the Lord looked down from heaven and heard the groaning of those who were bound [Psalm 101:20-21 LXX (=102:19-20 Eng.)], and he loosed the bonds of childlessness, which lay upon them like iron collars and constrained them, and he removed their reproach from them — I mean the heavy collar of childlessness that lay upon them. And for the aforementioned pair there came, according to promise, a fruit fair in appearance and in the condition of character. The fruit was fair to behold, but fairer in soul. The discourse has already explained beforehand how much and what kind of things the parents of the holy woman suffered when they were deprived of her.
5. Ὡς γοῦν τῶν παρακλούντων Θεοῦ πολλὰ πολέμας ἐκδυσσῶσσε· ἡκούσε καὶ πρὸς καιρὸν πάλιν ἰάσατο, τοῦτο μὲν δοκιμαζόντων τὴν καρτερίαν, εἰ μὴ ἐκκατοῦσεν τοὺς παρῶσσε, εἰ μὴ ἀπαγορεύοντων, εἰ ἀνασθῆσαι τὸ πᾶν τῷ Θεῷ· καθάπερ ὅλητα καὶ πεπονηκῶσιν, ὁμῆλει καὶ τοὺς θεοὺς νοσὶς συγχοῦς τῆς ἡμέρας· σφοδρῶντες· ἐπῶσσε· ἡμῶν· τὸν Κύριον [Psalm 118:164 LXX (=119:164 Eng.)]· καὶ τοὺς τῶν θεῶν γραφῶν ἀναγνώσσει, προσεμμένοντες προσευχῇ τε παννύχῃ καὶ νηστεία προσκείμενοι τῶν οὐδοῦσιν τοῦτο ἐξελκύοντων τὸν Κύριον· τὰς τῶν δοκίμων ἐξήλπον λίτας· ἰσοκαμῖ καὶ ἄννης, τὴν προνοῦν τῆς θαυματουργοῦ ἔπλεον συγχοῦς τὰ στήρνα, τὰ δὲ ἡμῶν τοὺς δοκῶσσε· ἔλεον [Psalm 6:7 LXX (=6:6 Eng.)]· ὅλλ' αὖτε <<τι βοᾶτε πρὸς με, >> παρὰ Κυρίῳ ἐπῶσσε· ὁ δὲ λόγος καὶ γὰρ στεναγμοῖς ἐβόων πρὸς Κύριον· <<Ἐπῶσκον ἡμῶν, ὁ Θεὸς ὁ σωτὴρ ἡμῶν, ἢ ἐλπίς πάντων τῶν περᾶτον τῆς γῆς καὶ τῶν ἐν θαλάσσῃ μακρῶν>> [Psalm 64:6 LXX (=65:5 Eng.)]· γονεὶς τοὺς δεσμένους αὐτοῦ ἀπαγοῦσεν· ὁ δὲ ἡμῶν τοὺς δοκῶσσε· ἔλεον [Psalm 6:7 LXX (=6:6 Eng.)]· 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Frontier AI model competition, 2025-mid 2026

Working A4 handout for Leeds IMC 2026: public flagship / near-frontier model releases by bloc

Use with caution: "frontier model" has no single public census. Epoch AI uses a technical definition: models in the top 10 by training compute at the time of release. Policy and press usage is looser: the leading or near-leading general-purpose foundation models. This handout uses the looser conference-handout sense: public flagship or near-frontier foundation / reasoning / multimodal model families, not every preview, embedding model, voice model, image model, safety model, or API variant.

Bloc	Major public developers / model families	Representative 2025 public releases	Representative 2026 public releases so far (to 14 June 2026)	Working count 2026 so far	Why this matters for the argument
United States	OpenAI / GPT and o-series; Anthropic / Claude; Google DeepMind / Gemini; Meta / Llama and Muse; xAI / Grok; Microsoft AI / MAI; Amazon / Nova.	OpenAI: GPT-4.5, GPT-4.1, o3/o4-mini, GPT-5. Anthropic: Claude 4 family; Claude 4.5 family. Google: Gemini 2.5; Gemini 3 Pro preview. Meta: Llama 4 Scout/Maverick/Behemoth preview. xAI: Grok 3, Grok 4, Grok 4.1 / 4.1 Fast. Amazon/Microsoft: Nova Sonic, Nova 2; MAI-DS-R1 and platform work.	OpenAI: GPT-5.4 and GPT-5.5 / 5.5 Instant. Anthropic: Claude Opus 4.6, Sonnet 4.6, Opus 4.7, Opus 4.8, Fable 5 / Mythos 5. Google: Gemini 3.1 Pro, Gemini 3.5 Flash. Meta: Muse Spark. xAI: Grok Build and voice / media specialist models. Microsoft: expanded MAI model suite across text, image, voice and speech.	Approx. 8-12 public major releases/updates, depending on whether specialist and variant models are counted. Roughly 5-6 broad general-model family updates.	The US remains the largest cluster, but it is not a single actor. Even within the US ecosystem, OpenAI, Anthropic, Google, Meta, xAI, Microsoft and Amazon have different incentives and release strategies.
China	DeepSeek; Alibaba / Qwen; Baidu / ERNIE; ByteDance / Doubao and Seed; Tencent / Hunyuan; Zhipu / Z.ai GLM; Moonshot / Kimi; MiniMax; 01.AI.	DeepSeek: R1 and V3/V3.2 attracted global attention. Alibaba: Qwen2.5-Max; Qwen3; Qwen3-Max / Qwen3-Omni. Baidu: ERNIE 4.5 and ERNIE X1. ByteDance: Doubao 1.5. Zhipu/Z.ai: GLM-4.5 and GLM-4.5V. Tencent: Hunyuan model releases and open-source expansion.	DeepSeek: V4 Preview. Alibaba: Qwen3.5 / Qwen3.5-Plus; Qwen3.7-Max. ByteDance: Doubao 2.0. Zhipu/Z.ai: GLM-5. Tencent: Hunyuan 3.0 reported/planned; verify exact public-release status before using as a counted item.	Approx. 4-6 confirmed major public releases/updates; substantially more if specialised vision, video, translation, coding and open-weight variants are included.	The AI Index reports that the US-China model-performance gap has effectively closed, with US and Chinese models trading the lead since early 2025. This is the strongest single-point illustration that AI development is now a multi-centre arms race rather than a single US corporate story.
Rest of world / regional and sovereign efforts	Mistral AI (France/EU); Cohere (Canada); AI21 Labs (Israel); Sarvam and BharatGen (India); Sber/GigaChat and YandexGPT (Russia); Aleph Alpha and other European specialised efforts.	Mistral: Mistral Medium 3; Magistral reasoning models; Mistral 3. Cohere: Command A, Aya Vision / Command A Vision. AI21: Jamba 1.6 / Jamba reasoning. India: Sarvam-M and sovereign-language models. Russia: GigaChat 2.0 and Russian-language model work.	Cohere: Command A+. AI21: Jamba2. India: Sarvam 30B / 105B open-source models reported. Mistral: NVIDIA partnership for open frontier models; Forge / industrial and physics-AI direction rather than a clearly separate general flagship release. Russia: GigaChat development constrained by chip access and sanctions.	Approx. 3-5 major public releases/updates, depending on whether sovereign-language and enterprise models are counted.	The "rest" is smaller than the US and China at the absolute frontier, but not irrelevant. European, Canadian, Israeli, Indian and Russian efforts show why capability diffusion is not just a Silicon Valley matter. Export controls may slow, redirect, or reshape development, but they are unlikely simply to stop it.

Slide-short version

- "Frontier model" is a moving frontier, not a fixed product category.
- By March 2026, Stanford AI Index placed Anthropic, xAI, Google, OpenAI, Alibaba and DeepSeek in the top Arena Elo tier, and described the US-China performance gap as effectively closed.
- The practical conclusion for the Leeds paper: the pace of development is not merely one company's release schedule; it is sustained by competing corporate and national ecosystems.



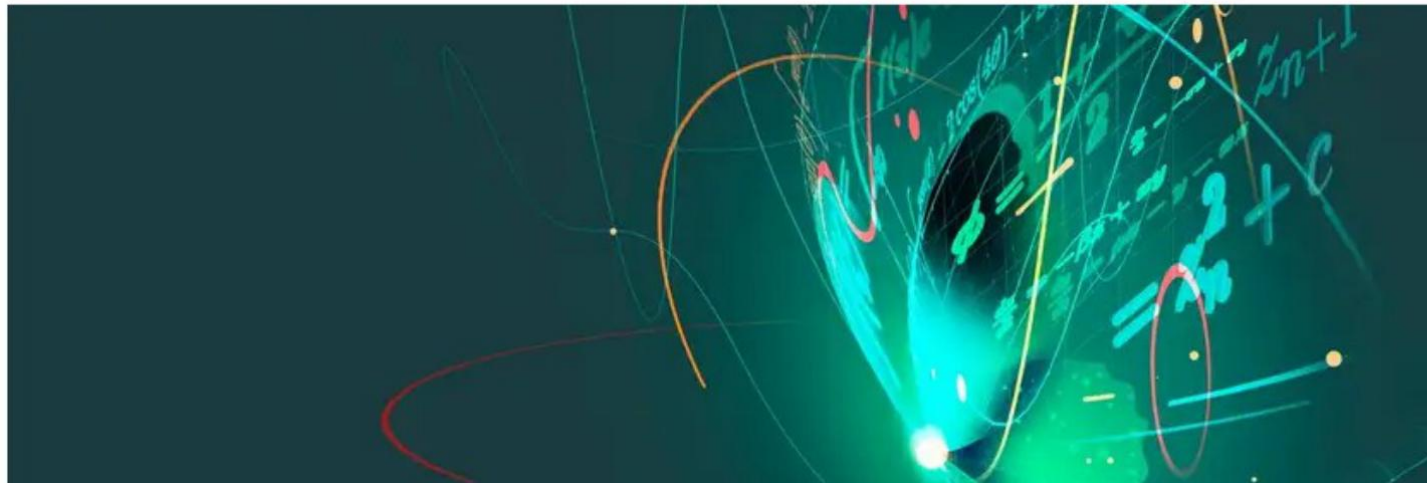
Mathematics

A golden age of maths is dawning and mathematicians are freaking out

Mathematicians are stunned at the progress AI is making in solving advanced problems, leaving some questioning whether there will still be room for humans

By [Alex Wilkins](#)

📅 1 June 2026





Jim O'Donnell

17 June at 22:01 · 🧑



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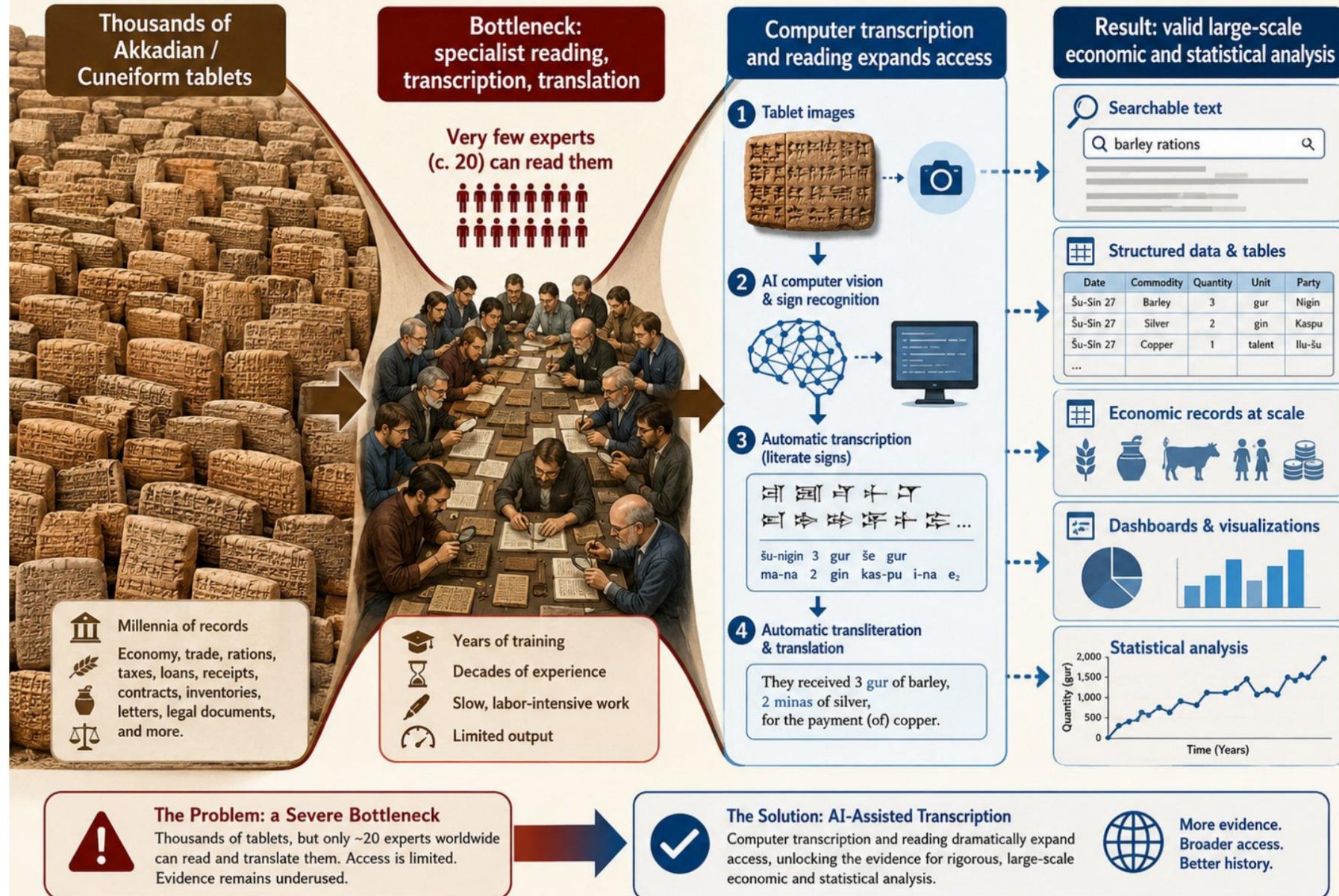
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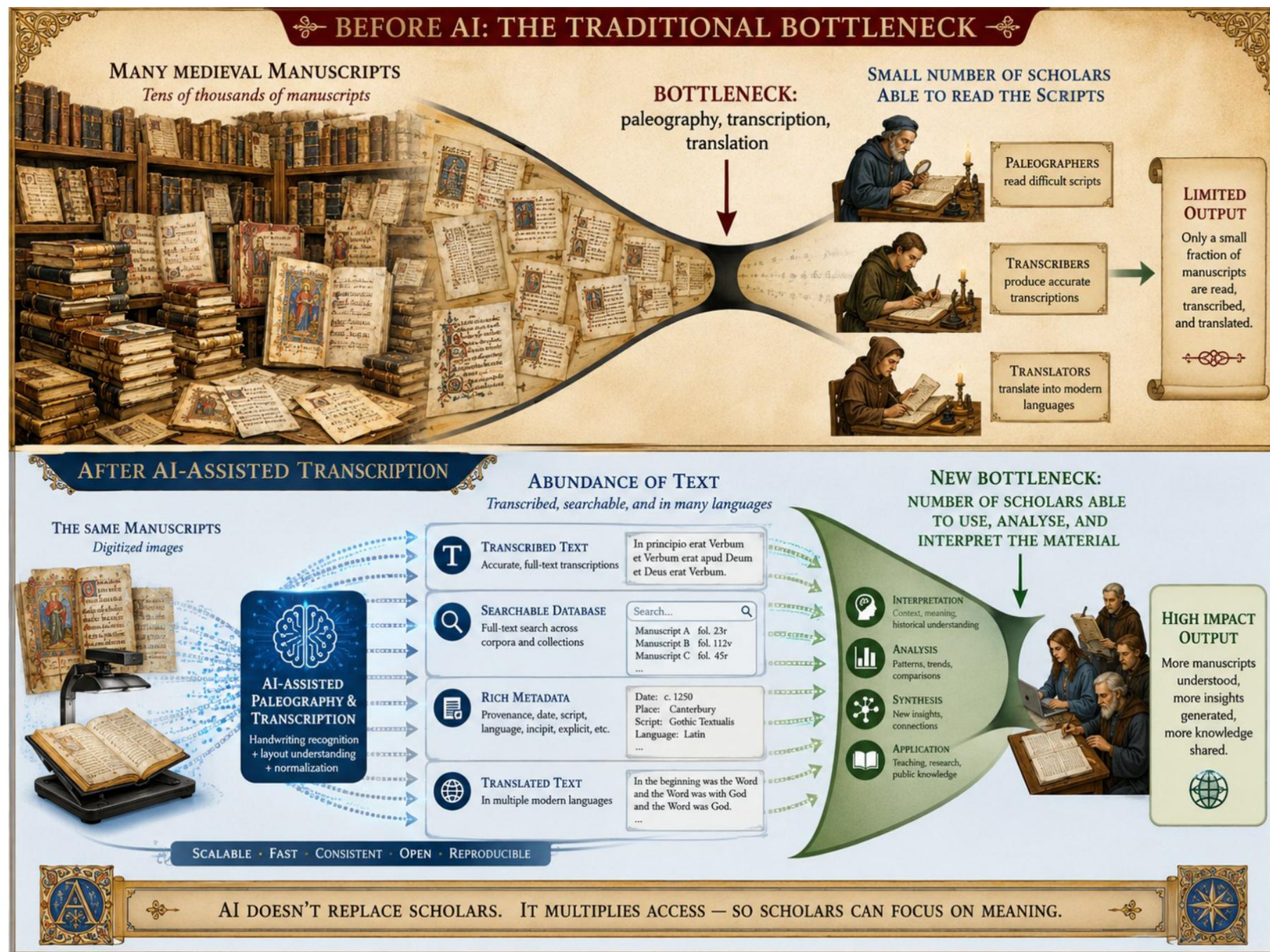




From Tablets to Insight: Removing the Bottleneck in Ancient-Language Research

Akkadian Cuneiform as an Example





Βίος καὶ πολιτεία τῆς ὁσίας καὶ θυμωμανουργοῦ Θεομήτορος

Greek text with English translation and highlighted Septuagint Psalm references

Note: The Greek text follows the text supplied in the prompt, including several apparent orthographic/OCR irregularities. Yellow highlighting marks direct quotations or close echoes of the Greek Psalms in the Septuagint. Psalm numbering below gives Septuagint numbering first, with common English/Hebrew numbers in parentheses. Non-Psalms biblical echoes are not systematically marked.

Greek text	English translation
4. Τοῦτοντος ἐπ' ἱκανὸν ὁ ἀπαύσιος ἔλκεται δεσμὸς, ὡς τοὺς τοῦ Κυρίου πόλιν προπύργους ἢ τῆς ἀρεκνίας πέδι συνεσφάγγει· ἐκλάνει τοῦτοντος πανκός, κατέσειε θαμνὼς, τὴν ψυχὴν διεσπάρτε, διηκενός, τοῖς θεοῖς νοῦς προσεδρεύοντες, παννύχους ἡμεροδίας προσμένοντες, νικτορ καὶ μεθ' ἡμέραν ἡμεροδίας τὸν Κύριον· οὐδὲ γὰρ σωματικῆς ἡδονῆς ἐνεκα πρὸς ὁμοφροσύνην ἐπράτταν· οὐμνημον· ὡλλ' ἐφύσει παύδος ἡγαθού, τῆς θαυμαστῆς οἱμῆι Θεομήτορος, πρὸς ἦν ὁ λόγος μάλλον ἐπιγίνεται· ὡλλὰ μικρὸν ἀνεμνάντω, ὡς ἂν τὰ τῆς ἀπαγγελίας ὁσος ἔχει σφωδρὸς ἀπαγγελίαν. Ἐπασχον οἱ γεννάδων τῷ πόθῳ κρίνοντες τὸ παύδος, ὡς πρὸν οἱ πρόγονοι τοῦ ἔμοῦ δεσπότη Χριστοῦ· οὐδότε πάντως, ὁ Θεὸς τίνος ἠνέκατο ἀθυμία συνεγχετο, θηνώδη συνέλεσκον ῥήματα, οὐκ ἐλθρον ἐκλαπρόντες Θεον· γονυπετιόντες, καθικνεύοντες, ὅταν τὴν ἡμέραν πενθοῦντες ἦσαν καὶ συνθροαζόντες· οὐκ εἶχον ὁ τι καὶ δράσαν· ἔπειτα οὐκ εἶχον τὸ σφόν αὐτῶν παρηγορήματα, τὰ τῆς Δουτικῆς φύλης συνάγκας ἥσαν ἐπιδόντες· <<Πολλὰ αἱ μιστήρες τῷ ἡμαρτολόγῳ, τὸν δὲ ἐλπίσαντο ἐπὶ Κυρίου ἔλεος κινύσσει>> [Psalm 31:10 LXX (=32:10 Eng.)] Ναὶ μύντω καὶ περικυκλώσαν ἔλεος καὶ δεσμεύουσιν οὐδ' ὅλας παρίστω· <<Ἐπάκουσον ἡμῶν, ὁ Θεὸς ὁ σωτήρ ἡμῶν, ἡ ἐλπίς πάντων τῶν περὶ τὸν τῆς-τῆς καὶ τῶν ἐν θυλάσει μυσκρῶν>> [Psalm 64:6 LXX (=65:5 Eng.)] Ἐπεβλέψε τοῖν ἐξ οὐρανῶ ὁ Κύριος καὶ τοῖς στεναγμοῖς τῶν πεπρημένον ἐπικρούσε [Psalm 101:20-21 LXX (=102:19- 20 Eng.)] καὶ τῆς ἀπαύσιος, δεσμῶς ὡς ἄλλους τινάς κλειοῦς σιδηροῦς ἐπικειμένους σφίσι καὶ περισφόνοντας ἔλυσε καὶ ἦρε τὸ οὐνεδος ἐξ αὐτῶν, τὸν τῆς ἀπαύσιος οἱμῆι κλειόν τὸν Βάρην αὐτοῖς ἐπικείμενον· καὶ γίνετα τοῖς εἰρημένους ἐξ ἀπαγγελίας καρπὸς ὠρατός τῶν ὄντων καὶ τὴν τοῦ ἥδους κατάστασιν· ὠρατός ἦν εἰς ὄραν ὁ καρπός, τὴν δὲ ψυχὴν ὠρατοτέρως. Ἀλλ' ὅταν μεν καὶ οἱ αἱ ὁσίας ἐπασχον οἱ γονεῖς στεροῦμενοι, φθόσος ὁ λόγος ἦδη προδισσάφονεν.	4. For a considerable time the bond of childlessness grieved them, just as the fetter of barrenness had once pressed tightly upon the ancestors of the Lord. It shook them often, convulsed them repeatedly, and tore their soul apart, as they continually waited in the divine churches, remained for all-night hymn-singing, and praised the Lord by night and by day. For they did not turn to married union for the sake of bodily pleasure — no indeed — but out of desire for a good child, I mean the wondrous Thomais, toward whom the discourse is hastening. But let it wait a little, so that it may first recount clearly how the story stands. The noble pair suffered, worn down by longing for the child, as once did the ancestors of my Master Christ. You surely know at whom the discourse hints. They were held fast by despondency, wove together mournful words, and did not cease imploring God. Falling on their knees and entreating him, they spent the whole day mourning and downcast. They did not know what they could do, since they did not have their own consolation. Often they chanted the words of the Davidic song: "Many are the scourges of the sinner, but mercy will encircle the one who hopes in the Lord." [Psalm 31:10 LXX (=32:10 Eng.)] And indeed mercy did encircle them, and he did not at all thrust aside those who were asking: "Hear us, O God our Saviour, the hope of all the ends of the earth and of those far away at sea." [Psalm 64:6 LXX (=65:5 Eng.)] Therefore the Lord looked down from heaven and heard the groaning of those who were bound [Psalm 101:20-21 LXX (=102:19-20 Eng.)]; and he loosed the bonds of childlessness, which lay upon them like iron collars and constrained them, and he removed their reproach from them — I mean the heavy collar of childlessness that lay upon them. And for the aforementioned pair there came, according to promise, a fruit fair in appearance and in the condition of character. The fruit was fair to behold, but fairer in soul. The discourse has already explained beforehand how much and what kind of things the parents of the holy woman suffered when they were deprived of her.
5. Ὡς γοῦν τὸν πυρικαλοῖόντων Θεὸς πολλὰ πολάκις ἐκδοσπομένους ἦκουσε καὶ πρὸς καρὸν πόλιν ἱάτατο, τοῦτο μὲν δοκιμάζων τὴν καρτερίαν, εἰ μὴ ἐκκακοῖεν τοὺς πειρασμοῖς, εἰ μὴ ἀπαγορεύοντες, εἰ ἀνατίθετα τὸ πᾶν τῷ Θεῷ· καθάπερ ὅττα καὶ πεποικισαν, ἀμέλει καὶ τοὺς θεῖους νοῦς συνάγκας τῆς ἡμέρας σκολάζοντες ἔπαύσε ἦγον τὸν Κύριον [Psalm 118:164 LXX (=119:164 Eng.)]. καὶ τὰς τῶν θεῶν γράφον ἀναγνώσαν προσεμμένοντες προσεσχητ' τε παννύχῳ καὶ νηστεία προσκειμένοι τέκνον δοθῆναι τοῦτο ἐξελάτρωον τὸν Κύριον· τὰς τῶν δικαίων	5. Since, then, God was often and repeatedly importuned by those who were calling upon him, he heard them and in due time healed them again, testing their endurance: whether they would lose heart in trials, whether they would give up, whether they entrusted everything to God. This, indeed, is just what they did. Spending much of the day in the divine churches, they praised the Lord seven times [Psalm 118:164 LXX (=119:164 Eng.)]. Devoting themselves to readings of the divine Scriptures, and giving themselves to all-night prayer and fasting,

Greek text	English translation
ἐξήλκον ἱάτα, ἱωακείμ καὶ Ἄννης, τὸν πρόγονον τῆς θεομήτορος· ἔπασον συνέκνωσας τὰ στέρνα, τὰ δέμανα τοῖς δοκρῶσιν ἔδοον [Psalm 67:1 LXX (=6:6 Eng.)]· ὡλλὰ <<τὶ βοᾷτε πρὸς με; >> παρὰ Κυρίου ἐπικρουν· ὡλλὰ τῶν καὶ γὰρ στεναγμοῖς ἐβόων πρὸς Κύριον· <<Ἐπάκουσον ἡμῶν ὁ Θεὸς ὁ σωτήρ ἡμῶν, ἡ ἐλπίς πάντων τῶν περὶ τὸν τῆς- τῆς καὶ τῶν ἐν θυλάσει μυσκρῶν [Psalm 64:6 LXX (=65:5 Eng.)]· γενὸς τοῖς δεσμεύουσιν αὐτὸς ἄραγος· ὡνθη ζηνέριβος τῷ Βουλήματι· δὲς κερπὸν κοιλίας τοῖς σοῖς οἰκταῖς ἐξαιτούμενος >> μὴ ἀράσις κενὸς οἰκτροῦς σοὶ λάτρες προσπατήσαντες >> Ταῦτα καὶ ταῦτα πρὸς Κύριον φάσκοντες οὐκ ἐνέλεον <<Μὴ ἐπαγορεύον ἡμῖν οἱ ἀντίπαλοι [Psalm 34:19/24 LXX (=35:19/24 Eng.)]· μὴ ἐπασχον ποὺ ἐστὶν ὁ Θεὸς αὐτῶν· ὁ δὲ Θεὸς ἡμῶν ἐν τῷ οὐρανῷ καὶ ἐν τῇ γῇ πάντα ὅσα ἡθέλησεν ἐποίησεν >> [Psalm 113:10-11 LXX (=115:2-3 Eng.)]. Τὴν γοῦν πρὸς ταῦτα ὁ τῶν θαυμάτων Θεὸς διαπράττει, τὴν τούτων δεῖσιν οὐ παρεβλέπε, τοὺς στεναγμοὺς οὐ παρεῖδεν· ἀλλ' ἐν βίᾳ τῶν νυκτῶν τῇ θαυμασίᾳ Καλῇ γοναῖται, τῇ τὸ ἥθος καὶ τὸν τρόπον ὄντως καλῇ, κατ' ὄναρ οὐράνεται ἡ πανήμιος παρθένος ἡ ἀπαρθεὺς καὶ αὐτολεῖται <<πρὸς ταῦτα>> οἱμῆι, <<μὴ συνήλθης, γυναι, μὴδὲ δυσσέβαντε τῆς ἀρεκνίας γάρνη τῆς σῆς· οὐ πόλιν τὸ ἐν μέσῳ, καὶ τέκνον ὅλιν τέξαις, πᾶσαν ἀθυμίαν ἀποδοῦσαι μέλλον ἐκ σοῦ πορρωτάτω, γυναι Κολῇ>> Ταῦτα σφεδρὸν τίμαρ ἡκικῶται παρὰ τῆς θεομήτορος, καὶ διανυσσάθεα τῷ ταύτης ἀνδρὶ ταῦτα πρὸς διὰ λέγειται· <<Θεὸς ἐνόντων ἦλθεν ἀνερπὸς καὶ διὰ τούτῳ ἐξηγήθη καὶ ἐδὼν· καὶ ὁ τίμος μὴ ὥς ἐγένετο >> Καὶ τὰ ὀφθέντα δηγήματα ζήματα. Ἀμέλει καὶ οὐ μετὰ πολλὰ συλλαβοῦσα τέκνον γεννᾷ κατὰ τὴν ὑπόσχεσιν τῆς ἀπαρθεῖντος κορῆς καὶ θεομήτορος· τούτῳ τὸ ὄνομα Θεομήτορος· τέκνον ἐξ ἀπαγγελίας ἀποστεφθέν, τὴν μὲν ὡσαν θῆλυ, τὴν δ' ὠρετὴν καὶ τὴν ἀσκησιν πολλὰ τῶν ὀφθέντων ὀφεινικωτέρων.	they earnestly begged the Lord that a child might be given to them. They emulated the supplications of the righteous Joachim and Anna, the ancestors of the Mother of God. They often beat their breasts and washed their beds with tears [Psalm 67:1 LXX (=6:6 Eng.)]. But they heard from the Lord, "Why do you cry out to me?" For us, O God our Saviour, the hope of all the ends of the earth and of those far away at sea [Psalm 64:6 LXX (=65:5 Eng.)]; be yourself the helper of those who ask; appear as a fellow-worker with our desire; give the fruit of the womb to your servants who ask you; do not send away empty your pitiable servants who fall before you." Saying these and similar things to the Lord, they did not cease: "Let not our adversaries rejoice over us [Psalm 34:19/24 LXX (=35:19/24 Eng.)]; "let them not say, Where is their God? But our God is in heaven and on earth, he has done all that he willed." [Psalm 113:10-11 LXX (=115:2-3 Eng.)] What, then, does the God of wonders do in response to these things? He did not overlook their prayer; he did not pass by their groans. But on one of the nights the spotless Virgin, the ever- virgin, appeared in a dream to the wondrous woman Kale — to the woman truly beautiful in character and conduct — and said in these very words: "In response to these things, woman, do not be downcast and do not be troubled because of your childlessness. It will not be long, and you will bear a female child who will drive all despondency far away from you, woman Kale." She had heard these things from the Mother of God almost as if awake. And when she had awakened, she spoke somewhat as follows to her husband: "A divine dream came in sleep, and because of this I awoke and saw; and my sleep became sweet." Then she recounted everything she had seen. And indeed, not long afterwards, having conceived, she bore a child according to the promise of the ever-virgin maiden and Mother of God. The child's name was Thomais; a child born according to promise, female in nature, but in virtue and ascetic practice much manlier than men.

Index of Psalmic material marked

Section	Greek phrase / cue	Psalm reference	Assessment
4	Πολλὰ αἱ μιστήρες ... ἔλεος κινύσσει	Psalm 31:10 LXX (=32:10 Eng.)	Direct quotation
4	Ἐπάκουσον ἡμῶν ... τὸν ἐν θυλάσει μυσκρῶν	Psalm 64:6 LXX (=65:5 Eng.)	Direct quotation
4	ἐξ οὐρανῶ ... τοῖς στεναγμοῖς τῶν πεπρημένον	Psalm 101:20-21 LXX (=102:19-20 Eng.)	Close adapted allusion
5	ἔπαύσε ἦγον τὸν Κύριον	Psalm 118:164 LXX (=119:164 Eng.)	Close echo
5	τὰ δέμανα τοῖς δακρυμένοις ἔδοον	Psalm 67:1 LXX (=6:6 Eng.)	Close echo
5	Ἐπάκουσον ἡμῶν ... τὸν ἐν θυλάσει μυσκρῶν	Psalm 64:6 LXX (=65:5 Eng.)	Direct quotation with added petition
5	Μὴ ἐπαγορεύον ἡμῖν οἱ ἀντίπαλοι	Psalm 34:19/24 LXX (=35:19/24 Eng.)	Adapted echo; closest wording occurs twice in the Psalm
5	μὴ ἐπασχον ποὺ ἐστὶν ... πάντα ὅσα ἡθέλησεν ἐποίησεν	Psalm 113:10-11 LXX (=115:2-3 Eng.)	Adapted quotation

Βίος καὶ πολιτεία τῆς ὁσίας καὶ θευματουργοῦ
Θωμάδου

3. Ταύτην ὁ φύσις πατήρ, ἀνὴρ θεαρέστες ζῶν καὶ βίον ἔχον ἀγγελικόν, Μιχαὴλ ὀνομάζετο, τὸν τρόπον χρηστός, τὸν βίον αἰμῶν, τὸ φρόνημα σταθμὸς καὶ πρὸ κατὰ πολὺς, τέλεια καὶ βεβαιότα φρονὸν ἐπέλει τῆς ἡλικίας τὸ κατισχύματα· ὡς ἀπόφως γὰρ οὐδὲν γὰρ ἐστὶ τὸν ἀπάντων λόγῳ καὶ ευφροσύνης ἐπαύον, οὐ φουσκόν, οὐκ ἀσκητόν, ὁ μὴ ἐκείνῳ προσήν· τὰς ἡμέρας πυξίδας ἀνεπιστάτων πυκνός, ἐν αἷς ἀντηρῆσται τὰ θεῖα θεσπισμένα, τὰς ἐν τοῖς θεοῖς ναὺς συνάξει ἀνερευθὺν, ὁπνίκα τὸ θεῖον διεξιλογέται θεμιδός, τῇ λέξει προσέχων, τὸν νοῦν ἀνιχνεῖν, τὸ φρόνημα τῆς σαφούς ταπεινὸν, τὸ ἴθος κομιῶν, τὸν βίον σεμνόνων, καλύπτει τὴν κεφαλὴν τὴν εἰς Χριστὸν ἀκραφυστατήν πιστὴν, καὶ τοῦτο πάντως ὡς συνेतός, τεθρίπτερο χρομένους ἀγάθῳ, τῇ τετρακτὶ λέγω τὸν ἄρετόν, δι· ἥς θαμινοτέρων οἰκεῖται Θεῷ. Τούτῳ συνέχευτο καὶ συναγνός τὸν βίον Καλῇ, τὸ ἴθος ἀκαλίστη, καλλίων δὲ ψυχὴν, σποροπόδα μύλλον, τὸ δ' ἀληθῆ εἶπεν ὁμοφρονόσα τάδε, τὴν πολιτείαν ἐπαυετή, τὴν γνώμην συνετή, καλὴ τὴν πραΐτητα· τοῦτο δὲ καὶ τῇ γυναικὶ προστηρήδε κύριον ὄνομα καὶ ταύτην προστηρίων ἐκ καλλίστης εὐφροτο προαιρέσεως, ὅτι καὶ καταπλήρης ὁ τρόπος ἀρεσκασθῇ τῇ εὐφρο· κινεῖσθαι καὶ συνεργός ἐδόθη κατ' αὐτὴν ἡ Καλὴ τὸ εἰρημένῳ ἀνδρὶ καὶ ζεύγους ἀρεσκασθῇ χρυσόν, ζεύγους τραπεζομένου καὶ μακαρίου, τὸν εὐαγγελικὸν εὐτόνος ἔλαον γόνον καὶ φυλάττων τὰ θεῖα θεσπισμένα, Μακάριον τοῦτον ἄμωφ κατὰ τὸν προφήτην ἐκείνον, οὐ τὰ μέλας Σαραφικός ἀνθρώος ἐξέφραον ὑπεράκθερα, ὅτι ἐν Σιών ἐστήκετο σπέρμα καὶ ἐν Ἱερουσαλὴμ οἰκεῖτος· Ἀλλ' ὅπου ἐλέγμεν οὕτω μὲν ἡ Καλὴ τὸν βίον ὁμοῖ καὶ θαρσύνος ἀνδρὶ νοήματος ὁμοφρονῶ συνέχευκτο· καὶ ἦν ὁρὸν ἄμωφ φρονούντας θεμὰ τὰ τοῦ βίου περιφρονώντας κατὰ, ὁμονούοντας, συμμενόντας· πλοῦτον δὲ καὶ χρημάτων ἦσαν ἔχοντες ἱκανός, οὔτε πενία συνδουλούμενοι τῇ μέσῃ τύχῃ προσελονόμενοι καὶ τῆς ἁρετῆς αὐτῶν τρονές ὡς οἶμα τεκμήριον.

The Life and Conduct of the Holy and
Miracle-Working Thomaïs

III. [Her most pious parents]
Her father, a man who lived in a way pleasing to God and maintained an angelic lifestyle, was named Michael.²³ He was upright in character, holy in his way of life, firm of purpose, prematurely gray-haired, possessed of a perfect and advanced understanding because of his mature age. So that, to tell the truth, there is no <virtue> at all worthy of words and praise, neither innate nor attained by practice, which did not accrue to him; frequently reading the holy books²⁴ in which the divine revelations have been recorded, searching out the assemblies in the divine churches when the Divine is warmly praised; paying attention to his manner of speech; examining his mind; humbling the spirit of his flesh; adorning his character; dignifying his life; covering his head in the most pure faith of Christ. And he was an intelligent man as well, making use of a good four-horse chariot,²⁵ I mean the quartet of the virtues,²⁶ as a result of which he very often spoke with God.

His wife and life companion was Kale,²⁶ who was most beautiful in character, and more beautiful in soul. <She was> quite temperate, and, to speak truly, was of one mind with her husband. She <was> praiseworthy in conduct, intelligent in her mind, and good in her disposition. This then [“Good”] was the woman’s personal name²⁷ and it found such an appellation from her exceedingly good disposition, because her character was indeed revealed to be appropriate to her name. And so Kale was given <in marriage> to be a companion for the aforementioned man, and they were revealed to be a golden team, a team thrice happy and blessed, vigorously bearing the evangelical yoke²⁸ and observing the divine precepts. Thus both were blessed like that prophet [Isaiah], on whose lips shone a seraphic and purging coal,²⁹ because they had *seed in Zion and household friends in Jerusalem*.³⁰ But, to return to my subject, Kale, who was God-pleasing in her lifestyle, was lawfully united with a man of the same habits. And one could often see both of <these> wise <individuals> holding in contempt the fine things of life, since they were of one mind. They had enough wealth and money that they were neither enslaved by poverty, nor were they swollen by the weight of money, but they

4. Τούτους παρ' ἱκανόν ὁ ἀπαίδιστος ἔλασται θεμιός, ὡς τοὺς τοῦ Κυρίου πόλιν, προπάτερως ἡ τῆς ἀρεσκείας πῆδη συνέσπρωγαν· ἐλάτοις τούτους πυκνός, κατέσειε Θεμίνδης, τὴν ψυχὴν διασπάραττε, διηνεκδός τοῖς θεοῖς ναὺς προεθρονονύτας, παννότης ὑμνολόγος προμεινόντας, νόστωρ καὶ μεθ' ἡμέραν ὑμνούντας τὸν Κύριον· οὐδὲ γὰρ κοιμητικῆς ἥθους ἔνεκα πρὸς ὁμογένειαν ἐτραπείραν σωμαίνον· ἀλλ' ἡρώσει παυδὸς ἀγάθῳ, τῆς θειασμότης φημι Θωμάδου, πρὸς ἦν ὁ λόγος μάλλον ἐπαιγεται· ἀλλὰ μικρὸν ἀναμεινέται, ὡς ἔν τὰ τῆς ἀπαγγελίας ὄνομα ἔχον σωφός ἀναμεινέται. Ἐπαύον οἱ γεννάτοι τῷ πόθῳ κείμεντες τοῦ παιδὸς, ὡς πρὸν οἱ πρόγονοι τοῦ ἐμοῦ δεσπότη Κυρίου· οὐδὲτε πάντως, ὁ λόγος τίνας ἠνέζετο· ἀθμίον συνέχευκτο, θρημώθῃ συνέχευκτον ῥήματα, οὐκ ἔλπιον ἐκαταπορόντες Θεόν· γονυπετούμετες, καθέκτεοντες, ὡν τὴν ἡμέραν πεφθύνοντες ἦσαν καὶ σκυθρωπίζοντες· οὐκ εἶχον ὅ,τι καὶ δράσειον· ἐκείτω οὐκ εἶχον τὸ σπῶν αὐτῶν παρηγόρημα, τὰ τῆς Δουλεῖνῆς ὥθης συνάκεις ἦσαν ἐπρόδοντες· <Πολύτοι αἱ μαστίγες τοῦ ἁμαρτολόου, τὸν δ' ἐλατίζοντα ἐπὶ Κύριον ἔλας κυκλόσται>· Ναὶ μέντοι καὶ περιεκύλωσεν ἔλας καὶ δορυμένους οὐδ' ἱλας παρόσταν· <Ἐπαύονον ἦσαν, ὁ Θεὸς ὁ σωτήρ ἡμῶν, ἡ ἔλας πάντων τὸν περάτων τῆς γῆς καὶ τὸν ἐν θαλάσῃ μακρῶν>· Ἐπέβλεψε τοῖνον ἐξ οὐρανόου ὁ Κύριος καὶ τὸν στεναγμόν τὸν περηθμένον ἔπικουσε· καὶ τῆς ἀπαίδιστος δεσμότης ὡς ἄλλους τινας ἔλασις στήθεος ἐπικειμένους σπῶσι, καὶ περισπείγοντας ἔλας καὶ ἦρε τὸ ὄναδος ἐξ αὐτῶν, τὸν τῆς ἀπαίδιστος φημι κλαῖον τὸν βαρὺν αὐτοῖς ἐπικείμενον· καὶ γίνεται τοῖς εἰρημένους ἐξ ἀπαγγελίας κυρτός ὁρῶνς τὴν ὄψιν καὶ τὴν τοῦ ἥους καταστάσιν· ὁρῶνς ἦν εἰς ὅρασιν ὁ καρπός, τὴν δὲ ψυχὴν ὁρατίστερος· Ἀλλ' ὅσα μὲν καὶ ὅλα τῆς ὁσίας Ἐπαύον οἱ γονεῖς στερνόμενοι, φθάσας ὁ λόγος ἦρη προδιδόστωσαν.

²³ “Michael” was, of course, a fitting name for a man who lived “the life of angels.”

²⁴ Lit. “unfolding the tablets.”

²⁵ The four cardinal virtues of antiquity were courage/manliness (ἀνδρεία), righteousness (δικαιοσύνη), prudence/moderation (σωφροσύνη), and prudence/good sense (ἐπιείκεια), cf. *ODB* 2178.

²⁶ Thomaïs’ mother, whose name means “good” or “beautiful.”

²⁷ “Κόρινθ βοῦμα,” a relatively rare expression. There is a parallel in the *vita* of the ninth-century saint Theophanes the Confessor, where it is said that as a youth he was usually called by his father’s name Isaac rather than by his given name (τοῦ κυρίου τῆς βοσκομένης ἐνονομαζόμενος); cf. *Thiophanes confessoris, ed. V. Liutjart* (88: Paderborn 1918), 5:7. Up to the tenth century Byzantine generally only had a baptismal name, and no surname, cf. *ODB* 143.

²⁸ Cf. Mt. 11:29-30.

²⁹ Cf. Is. 6:6-7.

³⁰ Is. 31:9.

³¹ This could be a reference to Abraham and Sarah, Gen. 16, or to Joachim and Anna; see, for example, the *Protosynagellion* of James ch. 1-2, in *New Testament Apocrypha*, ed. Edgar Hennecke and Wilhelm Schneemelcher, Vol. 1 (Louisville, Kentucky: Westminster Press, 1991), 426.

³² Or “Scripture.”

³³ Ps. 31 (32):10.

³⁴ Ps. 64 (65):5.

³⁵ I use περηθμένον for περηθμένον.

proceeded along in a middle path which is a clear sign, I think, of their virtue.

IV. [The sterility of Michael and Kale]

The fetter of sterility strongly grieved this <couple>, as of old the shackle of childlessness had bound the forefathers of the Lord.³¹ It agitated them mightily, upset them deeply, and tore apart their soul. They constantly went to the divine churches, remaining all night singing hymns, [235] not turned singing to the Lord both night and day. For they had not turned to marriage for the sake of bodily pleasure, quite the contrary, but out of desire for a good child, I speak of the wondrous Thomaïs, towards whom this account is hasting. But let it pause a little, so as to tell its tale as clearly as possible.

This good <couple> suffered <then>, being troubled by their desire for a child, as had the ancestors of my Lord Christ. You surely know <who they are>; <my> account³² has alluded to some of them. They were afflicted with despondency, and composed words of lamentation. They entreated God unceasingly; they kept falling down on their knees in supplication, and were mourning and of sad countenance all day long. They did not know what they could do. Since they had no consolation of their own, they used to sing frequently the song of David: “*Many are the scourges of the sinner, but him that hopes in the Lord, mercy shall compass about*.”³³

And indeed mercy did encompass them, nor did it wholly reject those who were entreating. “*Hearken to us, O God our savior: the hope of all the ends of the earth and of them that are on the sea far off*.”³⁴

Thus the Lord looked down from heaven and hearkened to the lamentation of this couple which was bound³⁵ <in sterility>, and he loosed the fetters of childlessness which were like iron collars laid upon them and binding them all around, and removed from them their disgrace. I mean the heavy collar of childlessness that was laid upon on them. And in accord with his promise the aforementioned <couple> obtained a fruit beautiful in appearance and in character. The fruit was beautiful to see, but even more beautiful in soul. But my previous account has already explained how much and in what ways the parents of the blessed <Thomaïs> suffered in being deprived <of a child>.

Frontier AI model competition, 2025-mid 2026

Working A4 handout for Leeds IMC 2026: public flagship / near-frontier model releases by bloc

Use with caution: "frontier model" has no single public census. Epoch AI uses a technical definition: models in the top 10 by training compute at the time of release. Policy and press usage is looser: the leading or near-leading general-purpose foundation models. This handout uses the looser conference-handout sense: public flagship or near-frontier foundation / reasoning / multimodal model families, not every preview, embedding model, voice model, image model, safety model, or API variant.

Bloc	Major public developers / model families	Representative 2025 public releases	Representative 2026 public releases so far (to 14 June 2026)	Working count 2026 so far	Why this matters for the argument
United States	OpenAI / GPT and o-series; Anthropic / Claude; Google DeepMind / Gemini; Meta / Llama and Muse; xAI / Grok; Microsoft AI / MAI; Amazon / Nova.	OpenAI: GPT-4.5, GPT-4.1, o3/o4-mini, GPT-5. Anthropic: Claude 4 family; Claude 4.5 family. Google: Gemini 2.5; Gemini 3 Pro preview. Meta: Llama 4 Scout/Maverick/Behemoth preview. xAI: Grok 3, Grok 4, Grok 4.1 / 4.1 Fast. Amazon/Microsoft: Nova Sonic, Nova 2; MAI-DS-R1 and platform work.	OpenAI: GPT-5.4 and GPT-5.5 / 5.5 Instant. Anthropic: Claude Opus 4.6, Sonnet 4.6, Opus 4.7, Opus 4.8, Fable 5 / Mythos 5. Google: Gemini 3.1 Pro, Gemini 3.5 Flash. Meta: Muse Spark. xAI: Grok Build and voice / media specialist models. Microsoft: expanded MAI model suite across text, image, voice and speech.	Approx. 8-12 public major releases/updates, depending on whether specialist and variant models are counted. Roughly 5-6 broad general-model family updates.	The US remains the largest cluster, but it is not a single actor. Even within the US ecosystem, OpenAI, Anthropic, Google, Meta, xAI, Microsoft and Amazon have different incentives and release strategies.
China	DeepSeek; Alibaba / Qwen; Baidu / ERNIE; ByteDance / Doubao and Seed; Tencent / Hunyuan; Zhipu / Z.ai GLM; Moonshot / Kimi; MiniMax; 01.AI.	DeepSeek: R1 and V3/V3.2 attracted global attention. Alibaba: Qwen2.5-Max; Qwen3; Qwen3-Max / Qwen3-Omni. Baidu: ERNIE 4.5 and ERNIE X1. ByteDance: Doubao 1.5. Zhipu/Z.ai: GLM-4.5 and GLM-4.5V. Tencent: Hunyuan model releases and open-source expansion.	DeepSeek: V4 Preview. Alibaba: Qwen3.5 / Qwen3.5-Plus; Qwen3.7-Max. ByteDance: Doubao 2.0. Zhipu/Z.ai: GLM-5. Tencent: Hunyuan 3.0 reported/planned; verify exact public-release status before using as a counted item.	Approx. 4-6 confirmed major public releases/updates; substantially more if specialised vision, video, translation, coding and open-weight variants are included.	The AI Index reports that the US-China model-performance gap has effectively closed, with US and Chinese models trading the lead since early 2025. This is the strongest single-point illustration that AI development is now a multi-centre arms race rather than a single US corporate story.
Rest of world / regional and sovereign efforts	Mistral AI (France/EU); Cohere (Canada); AI21 Labs (Israel); Sarvam and BharatGen (India); Sber/GigaChat and YandexGPT (Russia); Aleph Alpha and other European specialised efforts.	Mistral: Mistral Medium 3; Magistral reasoning models; Mistral 3. Cohere: Command A, Aya Vision / Command A Vision. AI21: Jamba 1.6 / Jamba reasoning. India: Sarvam-M and sovereign-language models. Russia: GigaChat 2.0 and Russian-language model work.	Cohere: Command A+. AI21: Jamba2. India: Sarvam 30B / 105B open-source models reported. Mistral: NVIDIA partnership for open frontier models; Forge / industrial and physics-AI direction rather than a clearly separate general flagship release. Russia: GigaChat development constrained by chip access and sanctions.	Approx. 3-5 major public releases/updates, depending on whether sovereign-language and enterprise models are counted.	The "rest" is smaller than the US and China at the absolute frontier, but not irrelevant. European, Canadian, Israeli, Indian and Russian efforts show why capability diffusion is not just a Silicon Valley matter. Export controls may slow, redirect, or reshape development, but they are unlikely simply to stop it.

Slide-short version

- "Frontier model" is a moving frontier, not a fixed product category.
- By March 2026, Stanford AI Index placed Anthropic, xAI, Google, OpenAI, Alibaba and DeepSeek in the top Arena Elo tier, and described the US-China performance gap as effectively closed.
- The practical conclusion for the Leeds paper: the pace of development is not merely one company's release schedule; it is sustained by competing corporate and national ecosystems.

Source notes and check-points

Source/check point	Use in handout	URL(s) to verify
Stanford AI Index 2026 overview and technical performance	Industry produced over 90% of notable frontier models in 2025; US-China model gap effectively closed; top Arena Elo tier named Anthropic, xAI, Google, OpenAI, Alibaba and DeepSeek as of March 2026.	https://hai.stanford.edu/ai-index/2026-ai-index-report ; https://hai.stanford.edu/ai-index/2026-ai-index-report/technical-performance
Epoch AI model database	Useful for definitions and checking. Epoch defines frontier models technically as those in the top 10 by training compute at time of release; database updated June 2026.	https://epoch.ai/data/ai-models
OpenAI	GPT-4.5, GPT-4.1, o3/o4-mini and GPT-5 in 2025; GPT-5.4 and GPT-5.5 in 2026. Check before printing in case GPT-6 or later 2026 releases appear.	https://openai.com/index/introducing-gpt-5/ ; https://openai.com/index/introducing-gpt-5-4/ ; https://openai.com/index/introducing-gpt-5-5/
Anthropic	Claude 4 in May 2025; Opus/Sonnet/Haiku/Opus 4.5 in late 2025; Opus 4.6, Sonnet 4.6, Opus 4.7, Opus 4.8, and Fable/Mythos 5 in 2026.	https://www.anthropic.com/news/claude-4 ; https://www.anthropic.com/news/claude-opus-4-6 ; https://www.anthropic.com/news/claude-opus-4-8 ; https://www.anthropic.com/news/claude-fable-5-mythos-5
Google DeepMind / Gemini	Gemini 2.5 and Gemini 3 Pro appeared in 2025; Gemini 3.1 Pro and Gemini 3.5 Flash in 2026. Google's own deprecation and model-card pages are useful for release dates.	https://ai.google.dev/gemini-api/docs/deprecations ; https://deepmind.google/models/model-cards/gemini-3-1-pro/ ; https://deepmind.google/blog/gemini-3-5-frontier-intelligence-with-action/
China: DeepSeek and Alibaba/Qwen	DeepSeek transparency page lists releases and dates; V4 released 24 Apr 2026. Qwen3 technical report and Qwen3.7 blog document Alibaba's rapid model line.	https://www.deepseek.com/en/transparency/ ; https://api-docs.deepseek.com/news/news260424 ; https://arxiv.org/abs/2505.09388 ; https://qwen.ai/blog?id=qwen3.7
China: Baidu, ByteDance, Tencent, Zhipu/Z.ai	Baidu ERNIE 4.5/X1, ByteDance Doubao 2.0, Tencent Hunyuan, and Zhipu/Z.ai GLM show that China is internally competitive, not simply "DeepSeek".	https://www.prnewswire.com/news-releases/baidu-unveils-ernie-4-5-and-reasoning-model-ernie-x1--makes-ernie-bot-free-ahead-of-schedule-302402490.html ; https://www.reuters.com/world/asia-pacific/chinas-bytedance-releases-doubao-20-ai-chatbot-2026-02-14/ ; https://www.tencent.com/en-us/articles/2202183.html ; https://z.ai/blog/glm-5
Meta, xAI, Microsoft, Amazon	Meta Llama 4 and Muse Spark; xAI Grok 4/4.1 and 2026 specialist releases; Microsoft MAI suite; Amazon Nova/Nova 2 and AWS platform role.	https://ai.meta.com/blog/llama-4-multimodal-intelligence/ ; https://ai.meta.com/blog/introducing-muse-spark-msl/ ; https://x.ai/news/grok-4 ; https://x.ai/news ; https://techcommunity.microsoft.com/blog/azure-ai-foundry-blog/new-mai-models-in-microsoft-foundry-across-text-image-voice-and-speech/4524632 ; https://www.aboutamazon.com/news/aws/aws-re-invent-2025-ai-news-updates
Rest of world	Mistral, Cohere, AI21, Sarvam and Sber/Yandex are not all at the same frontier level, but they demonstrate regional and sovereign efforts outside the US-China duopoly.	https://mistral.ai/news/mistral-3/ ; https://mistral.ai/news/magistral/ ; https://cohere.com/blog/command-a-plus ; https://www.ai21.com/blog/introducing-jamba2/ ; https://www.sarvam.ai/blogs/sarvam-m ; https://www.reuters.com/business/finance/sberbank-seeks-chinese-chips-power-russias-gigachat-ai-model-2026-05-20/

Draft prepared 14 June 2026. Counts are deliberately conservative and should be checked immediately before printing.