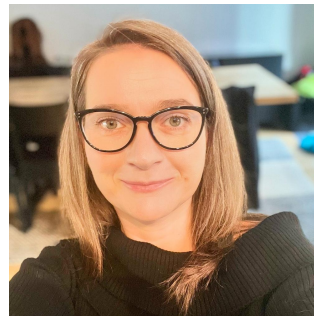


# Exploring the Potential of LLMs in the SDLC

*A Productivity Perspective*



Catarina I. Reis, PhD

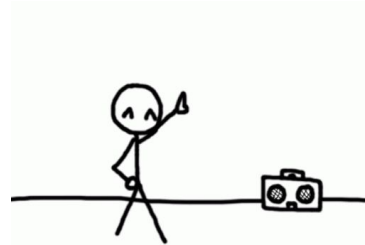


May 27-28 2025

Convento S. Francisco - Coimbra



# vibing?





**Andrej Karpathy**  @karpathy · Feb 2



There's a new kind of coding I call "vibe coding", where you fully give in to the vibes, embrace exponentials, and forget that the code even exists. It's possible because the LLMs (e.g. Cursor Composer w Sonnet) are getting too good. Also I just talk to Composer with SuperWhisper so I barely even touch the keyboard. I ask for the dumbest things like "decrease the padding on the sidebar by half" because I'm too lazy to find it. I "Accept All" always, I don't read the diffs anymore. When I get error messages I just copy paste them in with no comment, usually that fixes it. The code grows beyond my usual comprehension, I'd have to really read through it for a while. Sometimes the LLMs can't fix a bug so I just work around it or ask for random changes until it goes away. It's not too bad for throwaway weekend projects, but still quite amusing. I'm building a project or webapp, but it's not really coding - I just see stuff, say stuff, run stuff, and copy paste stuff, and it mostly works.



 1.3K

 5K

 29K

 5M



# SDLC ?

*Software Development Life Cycle*

# Trusted Sources

- IEEE Standards (IEEE 12207, IEEE 1012,...)
- ISO/IEC Standards (ISO/IEC 12207,...)
- SWEBOK - SoftWare Engineering Book of Knowledge
- “Software Engineering” by Ian Somerville
- SEI - Software Engineering Institute - at Carnegie Mellon
- Industry (Red Hat, IBM, Google,...)

# Models

- Waterfall
- Agile
- Spiral
- V-Model
- DevOps
- ...

Pick a flavour  
:)



1. Uncover what to do
2. Do it
3. Show off

# WHY DOES IT MATTER?

**Structure**

Efficiency

Planning

Cost control

Consistency

Alignment

**Productivity**

Innovation

Kaizen

Risk reduction

**Scalability**

Transparency / Visibility

Feedback loops

**Quality**

**Maintainability**

Traceability

Knowledge transfer

Accountability

Stakeholder trust

Repeatability

Compliance

**Collaboration**



meet



# ANNA

## Codebase Queen

- Tech Lead
- Architect - Strategist
- Hands-on coding
- Team support



# AXEL

## Bugsy Rookie

- Junior Tester / QAe
- Attention - Details
- Curious
- Confort with failure



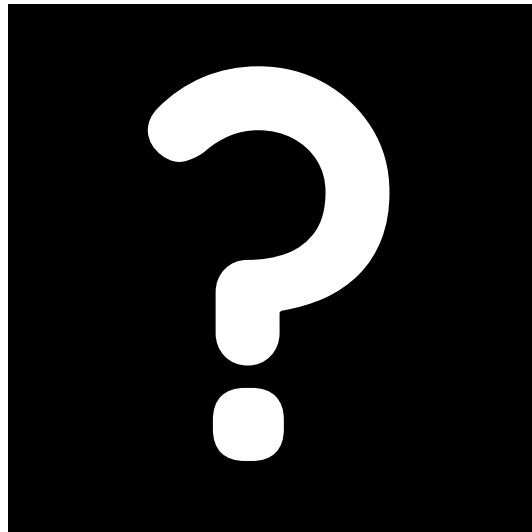
# ARI

## Captain Backlog

- PO / PM
- Masters Bus. Vision
- Stake. Whisperer
- Team Enabler







ChatGPT  
Gemini  
Perplexity  
Augment Code  
Cursor  
Windsurf  
Claude  
GitHub Copilot  
LLama  
DeepSeek  
CodeQwen

What is your LLM of choice?  
For work or for a pet project?  
And for which SE task?



science



# Large Language Models for Software Engineering: A Systematic Literature Review

Authors: Xinyi Hou, Yanjie Zhao, Yue Liu, Zhou Yang, Kailong Wang, Li Li, Xiapu Luo, David Lo, John Grundy, Haoyu Wang

[Authors Info & Claims](#)

ACM Transactions on Software Engineering and Methodology, Volume 33, Issue 8 • Article No.: 220, Pages 1 - 79

<https://doi.org/10.1145/3695988>

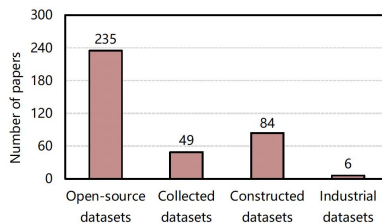
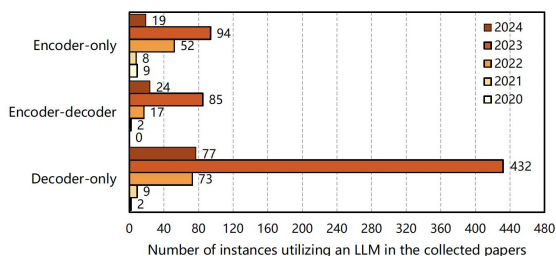
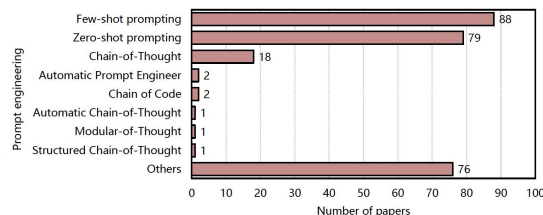


Fig. 6. The collection strategies of LLM-related datasets.



**2017-2024**

. 395 studies

. 70 LLM4SE

. decoder-only -  
generation tasks

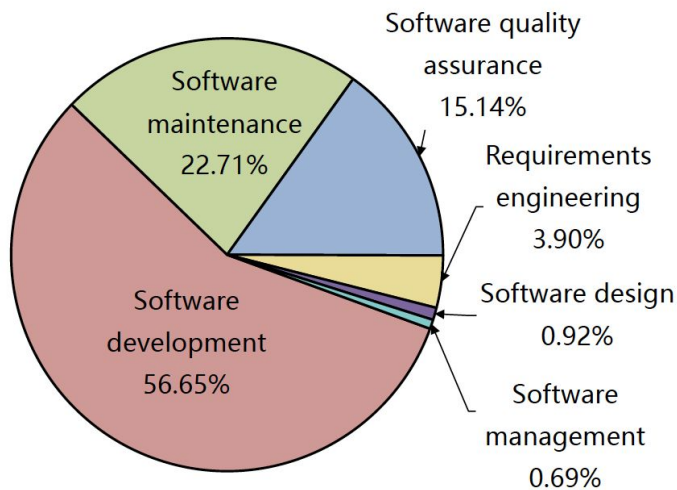
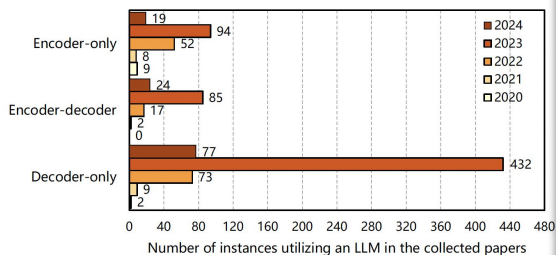
. 85 SE tasks

# Large Language Models for Software Engineering: A Systematic Literature Review

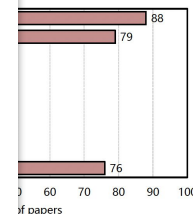
Authors: Xinyi Hou, Yanjie Zhao, Yue Liu, Zhou Yang, Kailong Wang, Li Li, Xiapu Luo, David Lo, John Grundy, Haoyu Wang | [Authors Info & Claims](#)

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(a) Distribution of LLM usages in SE activities.



**2017-2024**

. 395 studies

. 70 LLM4SE

. decoder-only -  
generation tasks

. 85 SE tasks

## Lost in the Middle: How Language Models Use Long Contexts

Nelson F. Liu<sup>1\*</sup>   Kevin Lin<sup>2</sup>   John Hewitt<sup>1</sup>   Ashwin Paranjape<sup>3</sup>

Michele Bevilacqua<sup>3</sup>   Fabio Petroni<sup>3</sup>   Percy Liang<sup>1</sup>

<sup>1</sup>Stanford University   <sup>2</sup>University of California, Berkeley   <sup>3</sup>Samaya AI  
[nfliu@cs.stanford.edu](mailto:nfliu@cs.stanford.edu)

*(...) In particular, we observe that performance is often highest when **relevant information occurs at the beginning or end of the input context**, and significantly degrades when models must access **relevant information in the middle of long contexts**, even for explicitly long-context models. (...)*

**2023**

Inputs

Architecture

Contextualization

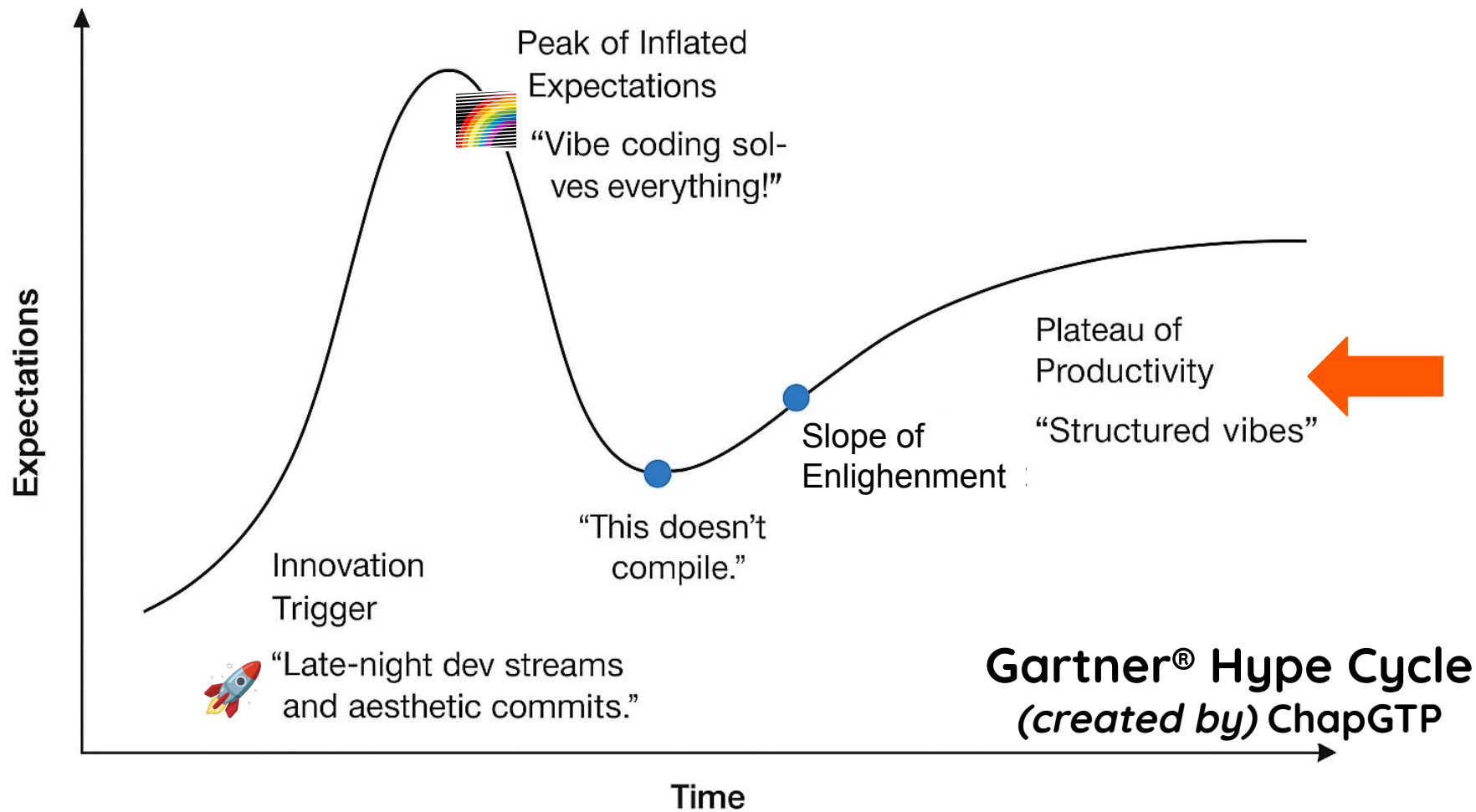
# The Effects of Generative AI on High-Skilled Work: Evidence from Three Field Experiments with Software Developers\*

Kevin Zheyuan Cui, Mert Demirer, Sonia Jaffe,  
Leon Musolff, Sida Peng, and Tobias Salz

February 2025

## Abstract

This study evaluates the impact of generative AI on software developer productivity via randomized controlled trials at Microsoft, Accenture, and an anonymous Fortune 100 company. These field experiments, run by the companies as part of their ordinary course of business, provided a random subset of developers with access to an AI-based coding assistant suggesting intelligent code completions. Though each experiment is noisy, when data is combined across three experiments and 4,867 developers, our analysis reveals a 26.08% increase (SE: 10.3%) in completed tasks among developers using the AI tool. Notably, less experienced developers had higher adoption rates and greater productivity gains.



where are *you* on the  
vibe curve?





**I Am Developer** ✓

@iamdeveloper

vibe coding, where 2 engineers can  
now create the tech debt of at least  
50 engineers

# challenges

- Productivity - define your metrics
- Model size and deployment || Cost
- Generic or General
- Assessment
- Explainability, Interpretability, Trust and Ethics
- Software Security
- Open Washing



- Productivity - define your metrics
- Model size and deployment || Cost
- Generic or General
- Assessment
- Explainability, Interpretability, Trust and Ethics
- Software Security
- Open Washing
- **Training - Academia <<<<<<< HELP!!!!**

## Personal Notes

- Vibe along
  - train your prompt engineering habilities
- Question everything / Be Curious
- Ask for the Chain of Thought
- Test, Test, Test

# Thank you!

## Contacts:

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linkedin: [in/reiscatarina](https://in/reiscatarina)



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- Z. Cui, M. Demirer, S. Jaffe, L. Musolff, S. Peng, & T. Salz, "The Effects of Generative AI on High-skilled Work: Evidence From Three Field Experiments with Software Developers", 2024. <https://doi.org/10.2139/ssrn.4945566>
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- "Severance outie affirmation meme generator," Imgflip, <https://imgflip.com/memegenerator/430282321/Severance-Outie-Affirmation> (accessed May 20, 2025).