AI Coding Workshop

April 2026 ~60 min

Xingjian Zhang · 2026

Outline

01 **Claude Code 101**
Basic commands, context, MCP, skills, agents, and hooks.

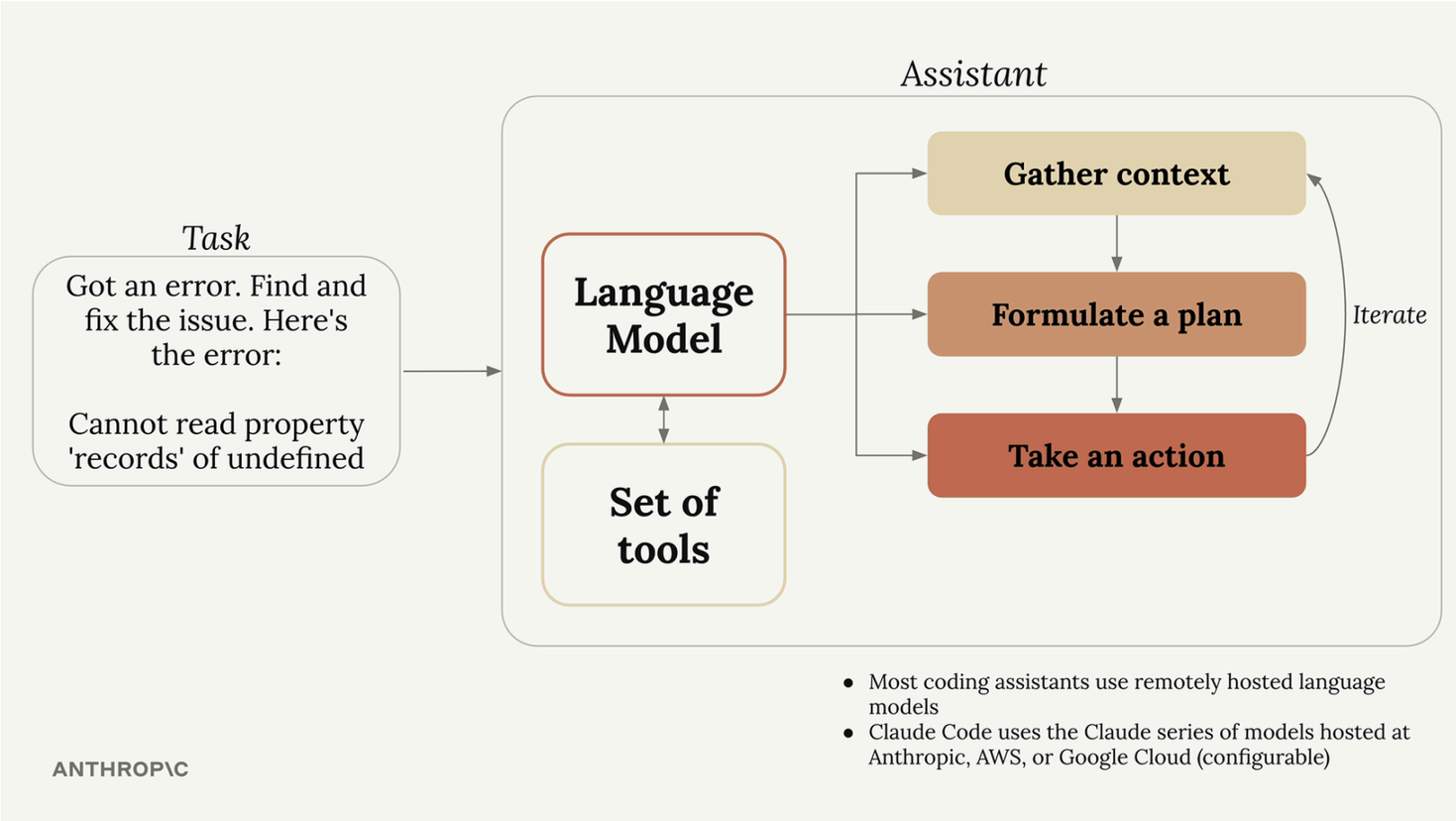
02 **Best practice & principles**
Manage context, delegate goals, verify outcomes, and automate repetition.

03 **Advanced usage**
Project folders, experiment logs, reproducible artifacts, and evidence discipline.

04 **Lab shared config**
A reusable Claude Code setup for Foreseer workflows.

05 **Agent workspaces**
Where to run agents, terminals, previews, and notifications.

Coding agent architecture (simplified)



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autonomy	you drive every keystroke	delegate a goal, walk away

§ 01

SECTION

Claude Code 101

`/powerup`: Quick start

```
› /powerup

❯ ○ Talk to your codebase    @ files, line refs
  ○ Steer with modes         shift+tab, plan, auto
  ○ Undo anything            /rewind, Esc-Esc
  ○ Teach Claude your rules  CLAUDE.md, /memory
  ○ Extend with tools        MCP, /mcp
  ○ Multiply yourself        subagents, /agents
  ○ Dial the model           /model, /effort

↑↓ to select · Enter to open · Esc to close
```

`CLAUDE.md`: Teach Claude your rules

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- A markdown file Claude reads at session start.
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- New repo? Run `/init` to draft a starter `CLAUDE.md`.

`CLAUDE.md`: What goes in

```markdown
## Storage
- /nfs/turbo/si-qmei/${USER} — datasets, checkpoints, envs.
- /scratch — hot I/O, copy back on job end.

## Compute
- Never run heavy jobs on login nodes.
- srun/salloc interactive · sbatch batch.

## Experiments
- experiments.md (index) + <date>_<name>.md (detail).
```

Full file: github.com/umich-foreseer/lab-claude-config/shared/CLAUDE.md

`/context`: Inspect the context

```
› /context


Context Usage
Opus 4.7 (1M context)
76.4k/1m tokens (8%)

Estimated usage by category
System prompt:  9.1k tokens
System tools:  29.5k tokens
MCP tools:     20.9k tokens
Custom agents:  1.0k tokens
Memory files:   1.8k tokens
Skills:         2.0k tokens
Messages:      14.3k tokens
Free space:   888.3k tokens
```

Operate it:

- `/context` — see what's loaded.
- `/compact` — summarize and free space.
- `/rewind` — step back.
- `/clear` — start fresh.

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Model Context Protocol: wire a service in once, then every agent can use it.

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- `github`, `filesystem`, `postgres` — common servers.

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- `github`, `filesystem`, `postgres` — common servers.

Operate: `/mcp` lists connected servers and tools.

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"Based on what we just did, create a skill for it." — Claude drafts the `SKILL.md`.

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Operate: `/agents` lists and configures agents.

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Use hooks for guardrails you need every time.

§ 02

SECTION

Best practice & principles

Principle #1

> Context is your
> most valuable resource.

Everything else is a corollary.

Use subagents for investigation

When — read a lot to answer a little.

How:

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- Parallelize: one agent per run directory.

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Why — it burns its own context; you get the summary.

Ref: code.claude.com — use-subagents-for-investigation

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Ref: code.claude.com — manage-context-aggressively

Principle #2

> Delegate,
> don’t micromanage.

Set the goal. Define how you’ll verify. Step back.

Plan → Auto

- Toggle **plan** and **auto** with `shift+tab`.
- Read the plan, redirect once, then let it run.
- For complex changes, review the diff instead of each tool call.

Spend time in the plan and the review, not mid-execution steering.

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When the agent can tell whether it’s done, you stop being the loop.

Let Claude interview you

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Ref: code.claude.com — let-claude-interview-you

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Codex inside Claude Code: github.com/openai/codex-plugin-cc

Principle #3

> Automate what repeats.

If you typed it twice today, it should be a skill.

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- *“Can I create a skill for this?”*
- *“Would a hook catch this automatically?”*
- *“Should this go in* `CLAUDE.md` *so I never type it again?”*

Let Claude write the skill

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- Claude drafts the file, names it, and shows the diff.

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Capture the version you just verified.

§ 03

SECTION

Advanced usage

Put everything in one folder

```tree
project/
├── src/                    # code
├── experiments/            # runs + logs
├── paper/                  # LaTeX, git-backed
├── results/                # tables + figures, auto-generated
└── refs/                   # Zotero export, BibTeX
```

One repo, one mental model. Code, results, and prose stay reachable.

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Test: delete `results/`, rerun the build, get the same paper.

Two-level docs: Index + detail

One self-contained index. One detail file per entry. Both readable on their own.

- **Index** (`experiments.md`) — one paragraph per run, grouped by phase.
- **Detail** (`experiments/<date>_<name>.md`) — reproduce or interpret one run.

Same shape: `papers.md` → `papers/<id>.md`

The index entry

Each entry: name, trial, headline observation, detail link. <100 words.

markdown

```
## SFT (v1)

- **sft-qwen3-1.7b** (1.7B full-FT): Scale-up test. 65.0% acc
  at epoch 2 — top v1 result in this comparison.
  [detail](experiments/2026-03-21_sft-qwen3-1.7b.md)

- ...
```

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Test: can a new lab member reproduce it from the file alone?

No hasty conclusions

Store facts by default. Conclusions need evidence.

Discipline: separate facts from interpretation.

```markdown
- Accuracy rose 0.52 → 0.61 from step 500 → 1400 [observed].
- Hypothesis [needs approval before saving]:
  4B may not amplify the diversity benefit seen at 1.7B.
```

Unverified hypotheses go into files only with explicit approval.

§ 04

SECTION

Lab shared config

`lab-claude-config`: Don’t bootstrap from scratch

Once Claude Code is installed, point it at the repo and ask it to deploy.

“Use this repo to set up my lab Claude Code config on Great Lakes.”

github.com/umich-foreseer/lab-claude-config

`lab-claude-config`: Skills

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- `/slurm-status` — current queue, your runs, partition pressure.

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- `/slurm-status` — current queue, your runs, partition pressure.
- `/connect` — cross-cluster SSH with the right keys + paths.

`lab-claude-config`: Agents & hooks

Agents — fresh-context investigators.

- `@slurm-queue` — survey the queue, find a free slot, suggest a partition.
- `@slurm-resource` — pick GPU / memory / walltime.
- `@slurm-storage` — choose Turbo, Scratch, or Data Den.

Hook — runs deterministically on every event.

- `node-context.sh` on `PreToolUse(Bash)` — detects login vs compute node and injects an advisory before shell calls.

§ 05

SECTION

Agent workspaces

Where do you run Claude Code?

An **agent workspace** is where you keep agents, code, logs, previews, and notifications visible.

Options:

- **VS Code's terminal** — one pane, close to the editor.
- **A regular terminal** — Ghostty, iTerm, Alacritty; bring your own panes and tabs.
- **Agent-native terminal** — packages panes, tabs, worktrees, and notifications.

My favorite right now: **cmux**.

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A native macOS terminal built around agent workflows.

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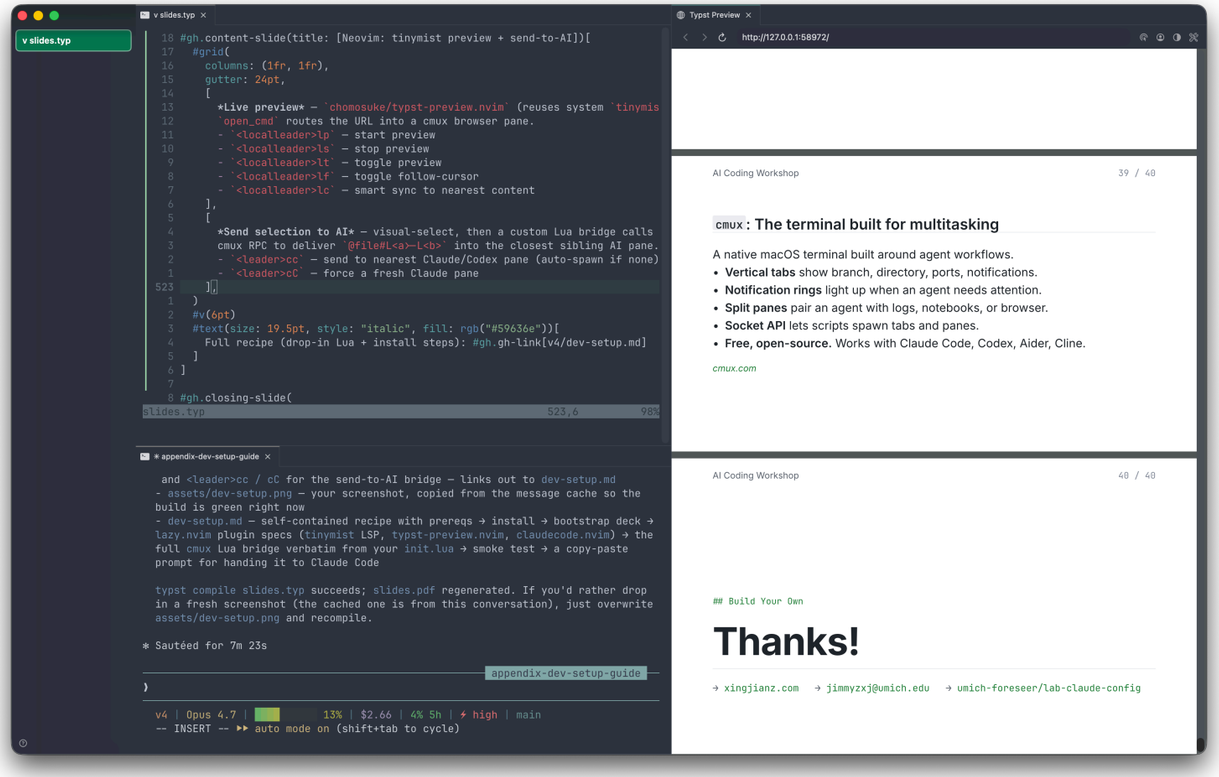
cmux.com

§ 06

APPENDIX

How I built this deck

The setup at a glance



Neovim + tinymist · Typst Preview in cmux's browser pane · Claude Code below

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- URL from a script: `cmux browser open <url>`.
- Automate panes: `cmux identify`, `cmux rpc pane.list / surface.list`, `cmux rpc surface.send_text / surface.focus`.

`cmux`: Editor, browser, and agents in one window

Cmux's panes hold **terminals** and a built-in **browser**, all addressable by RPC.

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- URL from a script: `cmux browser open <url>`.
- Automate panes: `cmux identify`, `cmux rpc pane.list / surface.list`, `cmux rpc surface.send_text / surface.focus`.
- Spawn a sibling: `cmux-spawn --split=right --dir <root> -- <cmd>`.

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This RPC surface is what the Neovim shortcuts on the next slide call into.

Typst + `gh-minimal-slides`: Slides as code

Typst compiles fast enough to live-preview every keystroke, and the theme ships every layout used in this talk.

typst

```
#import "@preview/touying:0.5.3": *
#import "gh-theme/lib.typ" as gh
#show: gh.register.with(theme: "light", accent: "green",
                        title: [My Deck])
#gh.cover-slide(title: [Hello])
```

Touying: touying-typ.github.io · Theme: github.com/xingjian-zhang/gh-minimal-slides

Neovim: tinymist preview + send-to-AI

Live preview — `chomosuke/typst-preview.nvim` (reuses system `tinymist`). `open_cmd` routes the URL into a cmux browser pane.

- `<localleader>lp` — start preview
- `<localleader>ls` — stop preview
- `<localleader>lt` — toggle preview
- `<localleader>lf` — toggle follow-cursor
- `<localleader>lc` — smart sync to nearest content

Send selection to AI — visual-select, then a custom Lua bridge calls the cmux RPC to deliver `@file#L<a>–L<b>` into the closest sibling AI pane.

- `<leader>cc` — send to nearest Claude/Codex pane (auto-spawn if none)
- `<leader>cC` — force a fresh Claude pane

Full recipe (drop-in Lua + install steps): xingjianz.com/ai-coding-setup

Build Your Own

Thanks!

→ xingjianz.com → jimmyzxj@umich.edu → umich-foreseer/lab-claude-config