Grading Rubric and MicroscoPilot

2024 Hackathon Judging Criteria (from the research paper)

The 2024 hackathon judged projects on a **0-5 scale** across **5 dimensions**:

1. **Innovation** - Novel approaches and creative solutions
2. **Technical Execution** - Code quality and implementation
3. **Difficulty** - Complexity of the problem tackled
4. **Teamwork** - Collaboration and team composition
5. **Presentation** - Communication and documentation quality

2024 Winning Projects Analysis

The first place winner was "GANder: Ferroelastic–Ferroelectric Domains Observed by Image-to-Image Translation", which used image-to-image translation with GANs. Other notable winners included:

- Microscopy LLM projects
- Automated AFM through model-driven segmentation
- Reward-driven phase mapping
- AI-powered thermal mapping

Common themes among winners:

- Used cutting-edge AI/ML (vision models, LLMs, GANs)
- Solved real microscopy problems
- Worked with DTMicroscope simulator
- Had strong autonomous/automated components
- Publication-ready quality

How MicroscoPilot Aligns ✅

Your project is **exceptionally well-aligned**:

Strengths:

1. **Innovation (5/5)** 🌟
   - Autonomous agent using Claude Vision API is cutting-edge
   - Combines multiple ML concepts (Bayesian optimization, active learning, pattern recognition)

- "Self-driving microscope" is a novel, memorable concept
- Zero-shot learning approach (no training data needed) is innovative

2. **Technical Execution (4-5/5)** ✅
   - Uses DTMicroscope simulator (official hackathon tool)
   - Professional architecture (modular, well-documented)
   - Comprehensive visualization dashboard
   - Memory system for learning
   - Your plan includes extensive error handling and testing
3. **Difficulty (4-5/5)** 💪
   - Multi-component system (vision, agent, memory, microscope control)
   - Real-time decision-making
   - Integration of multiple technologies (Claude API, DTMicroscope, visualization)
   - Benchmark comparisons show technical rigor
4. **Teamwork (Variable)** 👥
   - Your plan mentions finding teammates on Slack
   - Solo work is harder but possible - the plan is designed for it
   - **Recommendation:** Form a 2-3 person team for better scores
5. **Presentation (5/5)** 🎯
   - Your plan emphasizes beautiful visualizations
   - Side-by-side comparisons (demo gold!)
   - Comprehensive documentation (README, architecture docs, results)
   - Benchmark results with clear metrics
   - Video demonstrations

Competitive Advantages:

✅ **Aligns with 2024 winners** - They used vision models and automation
✅ **Solves real problem** - The event focused on autonomous experimentation and ML-driven automated experiments
✅ **Uses recommended tools** - DTMicroscope simulator
✅ **Publication potential** - After the hackathon, organizers plan to integrate projects into a scholarly publication
✅ **Impressive "wow factor"** - Live autonomous exploration is visually compelling

Alignment with Hackathon Goals:

The hackathon's "North Star goal" is to build the bridge between microscopy and machine learning communities. Your project:

✅ Bridges ML (Claude Vision) and microscopy (AFM)
✅ Focuses on autonomous experimentation (key theme)
✅ Creates reusable tools (open-source on GitHub)
✅ Educational component (beginner-friendly code)

Probability of Success: HIGH 🎯

Your project is **exceptionally well-suited** for this hackathon. The combination of:

- Cutting-edge AI (Claude Vision)
- Real problem solving (autonomous microscopy)
- Professional execution (your detailed plan)
- Impressive demonstrations (visualizations)
- Strong documentation

...puts you in strong contention for top prizes. The fact that your plan explicitly references 2024 winners and their approaches shows excellent strategic thinking.

Bottom line: This is a winning project concept with a solid execution plan. Focus on the demo, form a team if possible, and emphasize the scientific impact. Good luck! 🚀