

Generative AI to Accelerate Scientific Discovery

Beta v1

Perhaps the biggest impact of AI progress will be in accelerating the pace of scientific discovery. Traditional AI techniques such as machine learning have long been used in science. Now generative AI can be applied to amplify the cognition, creativity, insight, and capabilities of scientists. Here is a small selection of possible techniques.

Phase	Example applications	In practice
Observation and Curiosity	Generative Summaries: AI creating summaries and highlighting key findings from large datasets or experimental results to prompt new questions.	Analyzing oceanographic data to highlight unusual patterns in marine life migration, suggesting new areas of study.
Literature Review	Contextual Analysis: AI generating context-aware reviews by linking new research to existing literature, helping scientists quickly understand the relevance.	Producing a comprehensive summary of recent advancements in CRISPR technology, tailored to a researcher's specific focus area.
Idea Generation	Cross-Disciplinary Connections: AI generating potential interdisciplinary research ideas by combining concepts from different fields.	Proposing innovative uses of nanomaterials in drug delivery by integrating knowledge from materials science and pharmacology.
Hypothesis Formulation	Hypothesis Suggestion Engines: Generative AI proposing new hypotheses by identifying gaps and connections in current research.	Suggesting hypotheses about the impact of microplastics on marine ecosystems based on multi-factor analysis.
Experiment Design	Simulation-Based Design: AI generating virtual experiments to predict outcomes and refine real-world experimental designs.	Developing a detailed protocol for a synthetic biology experiment, including optimal conditions and potential pitfalls.
Data Collection	Enhanced Instrumentation Control: AI generating instructions for automated control of laboratory instruments to optimize data collection.	Developing customized survey questions for a large-scale sociological study on urban migration patterns.
Data Analysis	Generative Data Interpretation: AI generating interpretations of complex datasets, highlighting unseen emergent patterns and trends.	Analyzing and interpreting large genomic datasets to surface potential gene-disease associations.
Interpretation	Contextual Explanation: Generative AI providing context-aware explanations and interpretations of research findings.	Generating interactive visual explanations of climate model data, helping researchers and policymakers understand potential impacts.
Writing and Communication	Language Enhancement: AI improving the clarity and readability of scientific writing, translating complex ideas into accessible language.	Writing grant proposals that align with funding agency guidelines and highlighting novelty and impact.
Peer Review	Bias Detection and Suggestions: AI identifying potential biases or gaps in research and suggesting areas for improvement or additional study.	summarizing the main points from peer reviews of a submitted manuscript, providing authors with clear and actionable feedback.



ROSS DAWSON

- Futurist
- Keynote speaker
- Strategy advisor

AMPLIFYING
COGNITION

- AI-enhanced thinking
- The potential of Humans + AI
- AI-augmented decision-making