

# Space Biology Knowledge Engine

NASA Space Apps Hackathon 2025

By Team [ZeN-1](#)

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ZeN-1



# The Challenge: Data Chaos in Space Biology

## Fragmented Data

Crucial space biology data is scattered across disparate sources, crippling critical NASA missions.

## Critical Delays

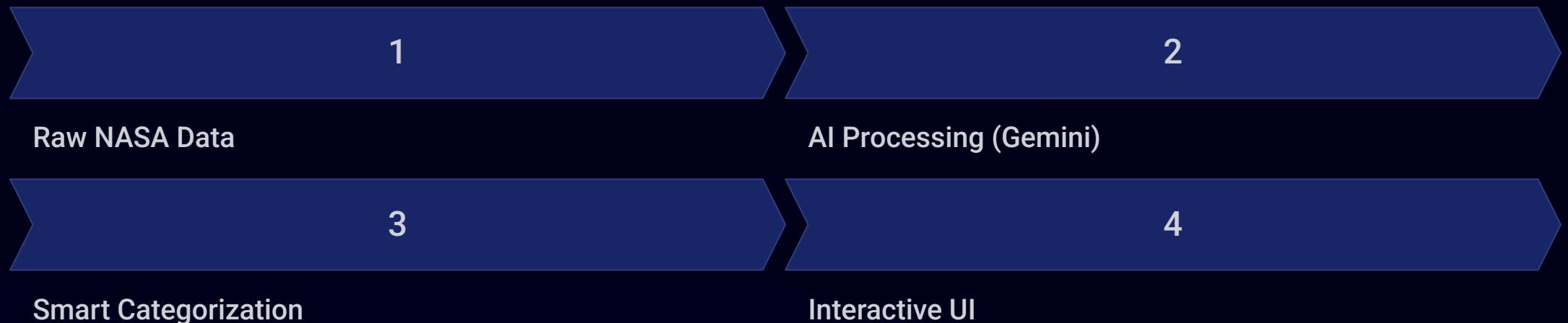
Overwhelming data chaos leads to unacceptable delays in vital research and decision-making.

# Our Solution: Space Biology Knowledge Engine

From Scattered Data to Structured Insight

Our AI-powered Knowledge Engine transforms chaotic space biology data into clear, actionable intelligence for rapid mission decision-making.

## How It Works: AI-Powered Pipeline



# Key Features



## AI Summaries

Get quick, clear summaries of complex research papers.



## Semantic Search

Find what you need quickly in large amounts of data.



## Research Cards

See important findings on easy-to-understand interactive cards.



## Detailed Modals

Explore findings in more depth with interactive details.



## Dynamic Filtering

Quickly narrow down search results with smart filters.

The screenshot shows the homepage of the Space Biology Knowledge Engine. At the top, there's a logo for "Space Biology Knowledge Engine" and a subtext "Explore NASA's Biology Research - Powered by AI". Below the header, a prominent title "Explore Space Biology Research" is displayed, followed by a subtitle: "Search, analyze, and visualize decades of NASA's space biology data. Discover how life adapts to microgravity, cosmic radiation, and beyond." A search bar with placeholder text "Search by title or keyword (e.g., radiation)" and an "AI" button is visible. Below the search bar, a section titled "Popular searches" lists "Microgravity", "Radiation", "Human Physiology", "Plant Growth", "Gene Expression", and "Stem Cells". On the right, a dropdown menu shows "All Research". In the center, there's a "Browse by Category" section with five cards: "Plant Biology" (7), "Radiation Effects" (6), "Human Physiology" (5), "Microbiology" (1), and "Cellular Biology" (9). The background features a dark theme with a faint DNA helix graphic.

This screenshot shows a detailed view of AI-powered research insights for the "Radiation Effects" category. At the top, it says "Browse by Category" and shows the same five categories as the homepage. A dropdown menu on the right also shows "Radiation Effects". Below this, the "AI-Powered Research Insights" section displays four research cards. Each card includes a thumbnail, the category ("Radiation Effects"), a title, a brief description, and a timestamp. The first card is about "Dose- and Ion-Dependent Effects in the Oxidative Stress Response to Space-Like..." from 2025. The second is about "Effects of ex vivo ionizing radiation on collagen structure and whole-bone..." from 2025. The third is about "NASA GenLab platform utilized for biological response to space radiation in..." from 2025. The fourth is about "Chromosomal positioning and epigenetic..." from 2025. The bottom of the page shows a footer with the text "29 results".

# Demo: UI in Action

Experience the intuitive and powerful workflow of our platform.

## 1. Initiate Search

Input research questions (e.g., "**radiation effects on astronauts**") for instant NASA data processing.

## 2. Refine with Filters

Apply dynamic filters by category (e.g., "**Human Physiology**") to narrow results precisely.

## 3. Review Research Cards

Quickly review interactive cards with **AI-generated summaries** and key details.

## 4. Explore Detailed Modals

Click cards to reveal full AI analysis, keywords, and direct links to **original NASA publications**.

# Future Roadmap

Charting our course to accelerate discovery and democratize scientific knowledge globally:



## Expanded Datasets

Unlock deeper scientific insights with integrated NASA research.



## Multilingual Support

Global access via AI-powered, multi-language summaries.



## API Access

Empower developers with seamless integration for innovation.



## Mobile App

On-the-go access for field research and real-time insights.

# Thank You

## Discover the Future of Space Biology Research

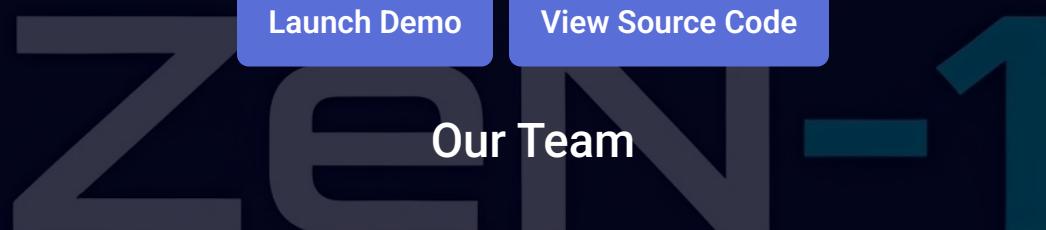
We are the minds behind ZeN-1, dedicated to revolutionizing access to space science.

**Our Mission:** Bridging complex space science with practical mission applications through innovative AI.

Experience our solution live:

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### Our Team

- Parmarth Kumar
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- Vansh Baranwal
- Diwakar Jha

Try the Demo • Explore the Future • Join the Mission

Together, we're not just organizing data – we're **pioneering a new frontier in scientific discovery**, one search at a time.