**SHIELD and a vision for our well-being**

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We are building a scientific network called **SHIELD** to study a multitude of natural and manmade factors that drive environmental interactions and human health. **SHIELD** will collect and integrate massive datasets from ecological field sites, human participants, satellites, and many other sources. With endowed support, our scientists will conduct independent, long-term research without pressure from special interests. They will evaluate the true costs and benefits of different land management practices, medical treatments, dietary regimes, and lifestyle choices. Thus, **SHIELD** will provide the scientific foundation that we desperately need to support evidence-based health and environmental policy, safety regulations, and decision making.

**SHIELD**’s potential scope is massive, comparable to the $250 billion in today’s dollars that the Apollo Program spent between 1960 and 1973 to go to the moon. Over the next century its mission is to understand the diversity of life across the continent, the ecosystem functions that sustain it, and the complexity of interacting factors that determine our health. Its grand challenges are to

1. **understand how species interact** across North America’s ecological domains and within landscapes of terrestrial, aquatic, and marine habitats;
2. determine how to **protect native species** in viable communities;
3. **warn of emerging diseases** and other new threats;
4. **detect invasive species** and develop safe methods to control them;
5. analyze the **relative risks** to biological systems posed by climate change, pollutants, and other factors, so that policy makers can better prioritize possible responses;
6. unravel the yet-unknown genetic, environmental, and other **causes that underlie diseases**, particularly the chronic ones that afflict over half our population, and ones like Parkinson’s that may take decades to manifest symptoms.

We envision regional centers in **SHIELD** providing the infrastructure, technology and training to assemble enough data from study sites and public participants to meet these challenges. Our methods will include integrating datasets from NOAA, NASA, the US Census and other sources; using AI to analyze sound recordings, and improving the existing DNA library to help document species and their interactions.

With sufficient data from natural experiments and randomized controlled trials, we will evaluate the risks of an array of toxicants, lifestyle variables, and other environmental factors. Paramount to our success is protecting the privacy of all our participants’ personal information. Through data encryption we will make it impossible for database managers to view data and for courts to subpoena them.

Our immediate goals are to expand Discover Life’s database and analysis capacity at Sam Houston State University, Texas into **SHIELD**’s first regional center and then to develop five additional centers with expertise in image processing, taxonomy, field sampling, endangered species management, and pollinators. These are respectfully in CA, DC/MD, GA, KY, and PA.