

**The BIOS Initiative: Biological Open Source, Patent Informatics and
Distributive Innovation in the Real World
OR
Building a LAMP Stack for Life Sciences**

It is commonplace to regard health crises, sickness, malnutrition, famine and natural resource collapse as overwhelming problems of our world, typically associated with poverty.

Rather, they are symptoms of a more fundamental failing in how we deal with the world, and to whom we give the tools to engage. Four billion poor people are not just a problem, they are world's greatest resource for problem solving. What we lack are the norms, the tools and the mechanisms to harness and empower their commitment, their drive, their local knowledge and their creativity. But this is within our grasp.

This presentation outlines the real origins of Open Source - not the recent phenomenon in software development, but the very foundation of all of civilization: plant and animal domestication and breeding. Virtually every key element of productive, economically savvy Open Source innovation was developed and presaged by millennia of plant breeders and farmers who created the wealth upon which society is based. The engine room of civilization has been agriculture, but the fuel has been shared innovation.

Perhaps the most powerful development in human society has been the articulation and honing of the scientific method. Its power to acquire true information, morph it into knowledge, build and test hypothesis rapidly and create a robust platform for progress is unprecedented in history. But as this power grew, so did our mechanisms to own, control and restrict it. As with the clergy of the middle ages, science and those who enclose it have built self-perpetuating temples of wealth and power which leave countless people and problems marginalized.

The tools to change this are at hand. The revolutions in informatics, communications, life sciences can and must now be matched by revolutions in the democratization of scientific problem solving and its incorporation into business and the creation of wealth - not solely the accumulation of wealth.

Big business in pharmaceuticals, food and other biological innovation spaces operates under antiquated business models that do not clearly distinguish between the tools of innovation and their products.

The problem is not solely multinational corporations gaming the patent system and the associated business practices. It is also the failure of public sector to engage creatively with their responsibilities.

It's also how the patent system has evolved (if indeed we can grace such an accretion of carbuncles with that glorious biological process) and how business practices and models are groaning under the weight of its excesses. Modern informatics has enormous potential to parse and integrate this information so that anyone can understand and appreciate the landscape upon which innovation must operate, and can guide new business models that use shared and accessible tools to create myriad applications, products and services.

Completely new approaches to inclusive problem solving can be and have been created. Amongst its other work, the BiOS Initiative has integrated patent analysis with targeted work-beyonds to create and distribute toolsets that can lead science in new directions, and change society's view of who can solve problems. For instance, the concept of Bioindicators: using modern genetics to forge heuristics - allowing plants to be engineered as instruments so farmers worldwide will have more and better information to guide the local innovative capability. This can create zero-cost instruments, built from modular, open source components to allow environmental measurements and action.

The LAMP Stack for life sciences is not just a techno-dream, but a social entrepreneur's imperative. With the creation of the BiOS "Apollo Project" we expect a new age of biological innovation, with social justice alongside new creative science-based business.