

# Providing High-Quality Innovation and Technology Support Services – University and Government Technology Transfer in the USA

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## Overview:

- Technology Transfer Defined
- Mission and Policy
- Statutory Basis of Technology Transfer in the USA
- Benefits of Technology Transfer
- Technology Transfer Offices (TTOs)
- Future of Technology Transfer: Challenge and New Models
- Overview of the Technology Transfer Process
- US Federal Lab Technology Transfer – NASA
- Space Technology
- From Mars back to Earth

# Technology Transfer Defined



**Technology transfer** is the sharing of skills, knowledge, technologies, and facilities among industries, universities, governments and other institutions to make scientific and technological developments accessible to a wider range of people who can further develop and exploit the technology.

[IP Advocate]

**Technology transfer** is the process of transferring scientific findings from one organization to another for the purpose of further development and commercialization. [AUTM]

**The technology transfer process typically includes:**

- Identifying new technologies
- Protecting technologies through patents and copyrights
- Forming development and commercialization strategies such as marketing and licensing to existing private sector companies or creating new start-up companies based on the technology [AUTM]

**The ultimate benefits of technology transfer, however, are the public benefits derived from the products that reach the market and the jobs that result from the development and sale of products. [AUTM]**

**Investments in intellectual property are returned to the public through products that benefit the public, increased employment, and state and federal taxes.**

*These activities can be pursued without disrupting the core values of publication and sharing of information, research results, materials and know-how. [AUTM]*

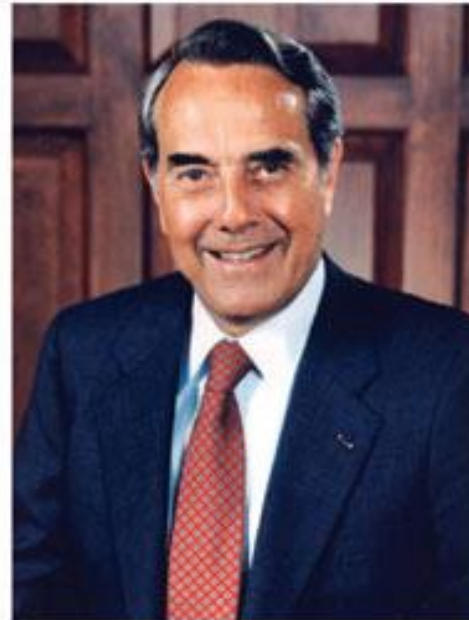


**As the transition from a manufacturing-based economy to a knowledge-based economy continues, the role of university intellectual property will play an increasingly important part. Many states are developing programs to enhance economic development through technology transfer from local research universities. [AUTM]**

# Statutory Basis: University Technology Transfer in the USA



Birch Bayh



Bob Dole

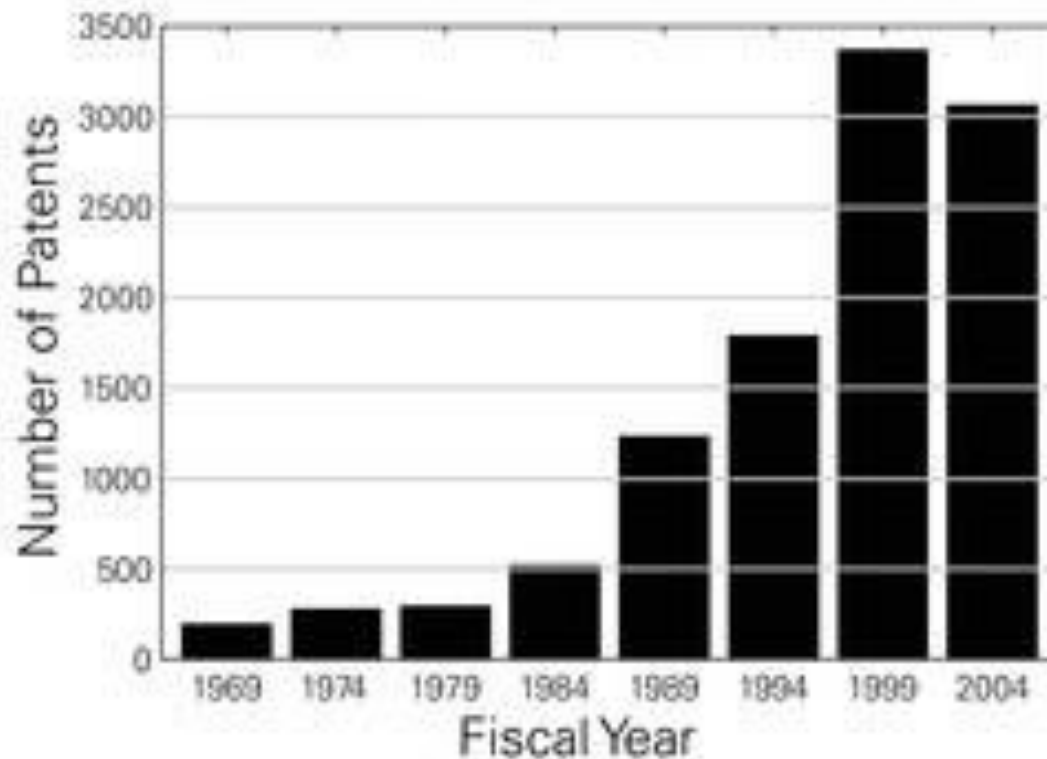
**Enacted in 1980, the Bayh-Dole Act created a uniform patent policy among the many federal agencies that fund research, enabling small businesses and non-profit organizations, including universities, to retain title to inventions made under federally-funded research programs.**



# **Bayh-Dole Impact**

**According to a study by the Council on Government Relations (COGR), University patenting and licensing efforts under the Bayh-Dole Act have fostered the commercialization of many new technological advances that impact the lives of millions of people across the nation.**

## Patents Issued to U.S. Universities



**Bayh-Dole Impact:**

## **Bayh-Dole Impact:**

**A recent survey by the Association of University Technology Managers (AUTM) revealed that many of the active licenses of responding institutions are in the life sciences - yielding products and processes that diagnose disease, reduce pain and suffering, and save lives. Most of the inventions involved were the result of federal government funding.**



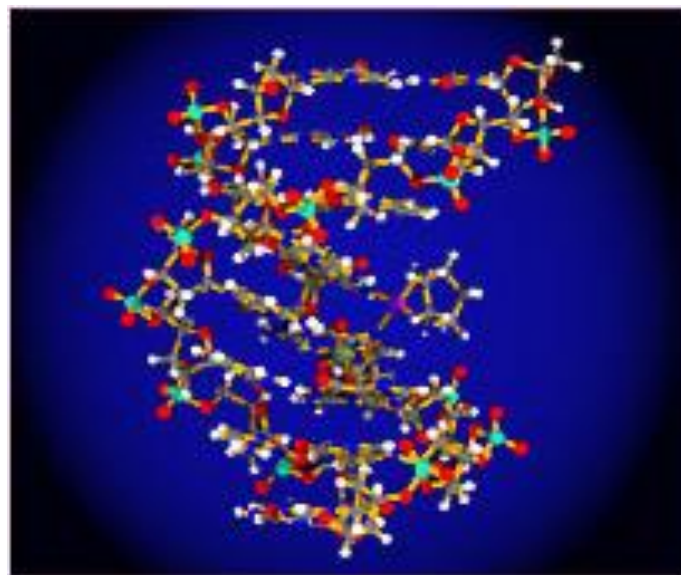
**A few widely notable examples follow....**

# Artificial lung surfactant for use with newborn infants, University of California





# Cisplatin and carboplatin cancer therapeutics, Michigan State University



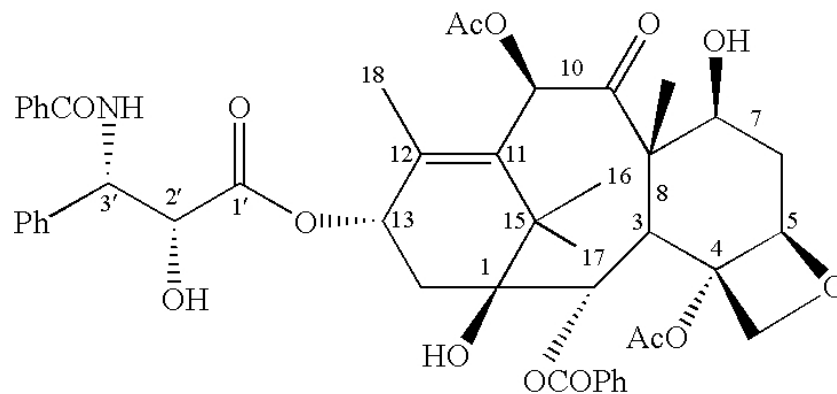
# Citracal calcium supplement, University of Texas Southwestern Medical Center



# Haemophilus B conjugate vaccine, University of Rochester



# Metal Alkoxide Process for taxol production, Florida State University



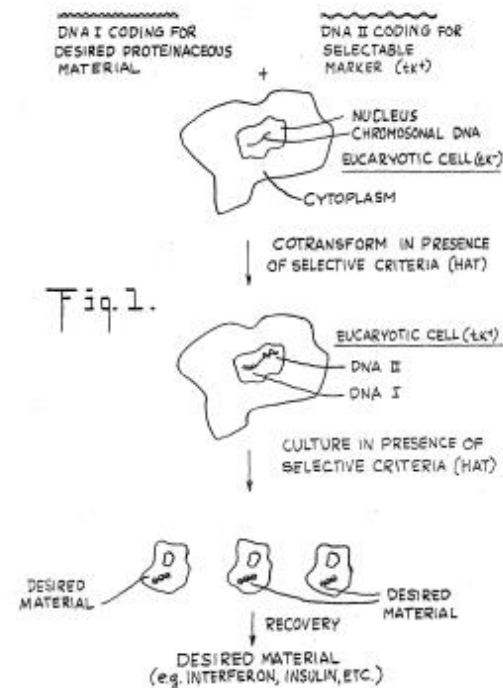
**Neupogen used in conjunction with  
chemotherapy,  
Memorial Sloan Kettering Cancer Institute**



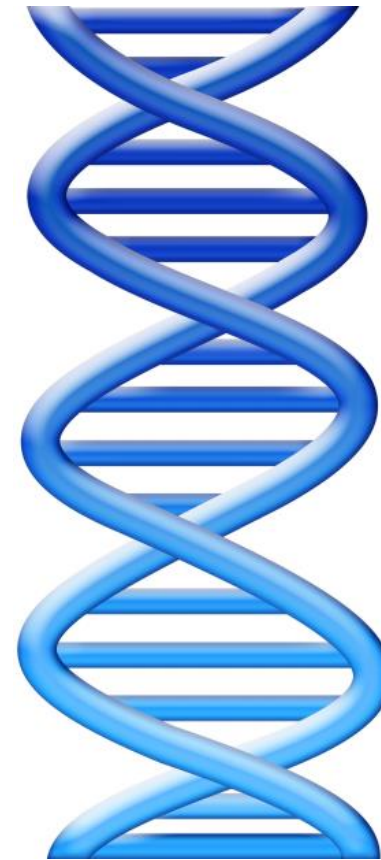
# Process for inserting DNA into eukaryotic cells and for producing proteinaceous materials, Columbia University

U.S. Patent Aug. 16, 1983 Sheet 1 of 2 4,399,216

## COTRANSFORMATION OF EUKARYOTIC CELLS



**Recombinant DNA  
technology, central to  
the biotechnology  
industry,  
Stanford University and  
University of California**



# TRUSOPT(r) (dorzolamide) ophthalmic drop used for glaucoma, University of Florida





# Technology Transfer Offices



**Technology Transfer Offices (TTOs)** - an organization within a university or government body that identifies research initiatives that have the greatest commercial potential, and facilitates their commercialization. They provide strategies for these discoveries and help to guide the process to fully exploit its opportunity. They are also known as "Offices of Technology Transfer."

# Technology Transfer Offices (TTOs)

**In the U.S., research universities establish Technology Transfer Offices:**

- To assist faculty and researchers**
- To evaluate inventions**
- To determine whether or not to protect intellectual property rights, and to manage patenting process**
- To market innovations to industry partners**
- To negotiate legal contracts with these industry partners to transfer rights in exchange for royalties or other consideration**
- To assist in creation of spin-off companies**

## **TTO Organizational Structures:**

- **A TTO as an office within the university**
- **An external TTO owned by the university, which can be “not for profit” or “for profit”**
- **Combination of an internal and external office**
- **A company contracting with the university to manage its innovations and tech transfer**
- **One TTO serving a “consortium” or collection of universities in a region**
- **A Government Agency serving as a TTO**

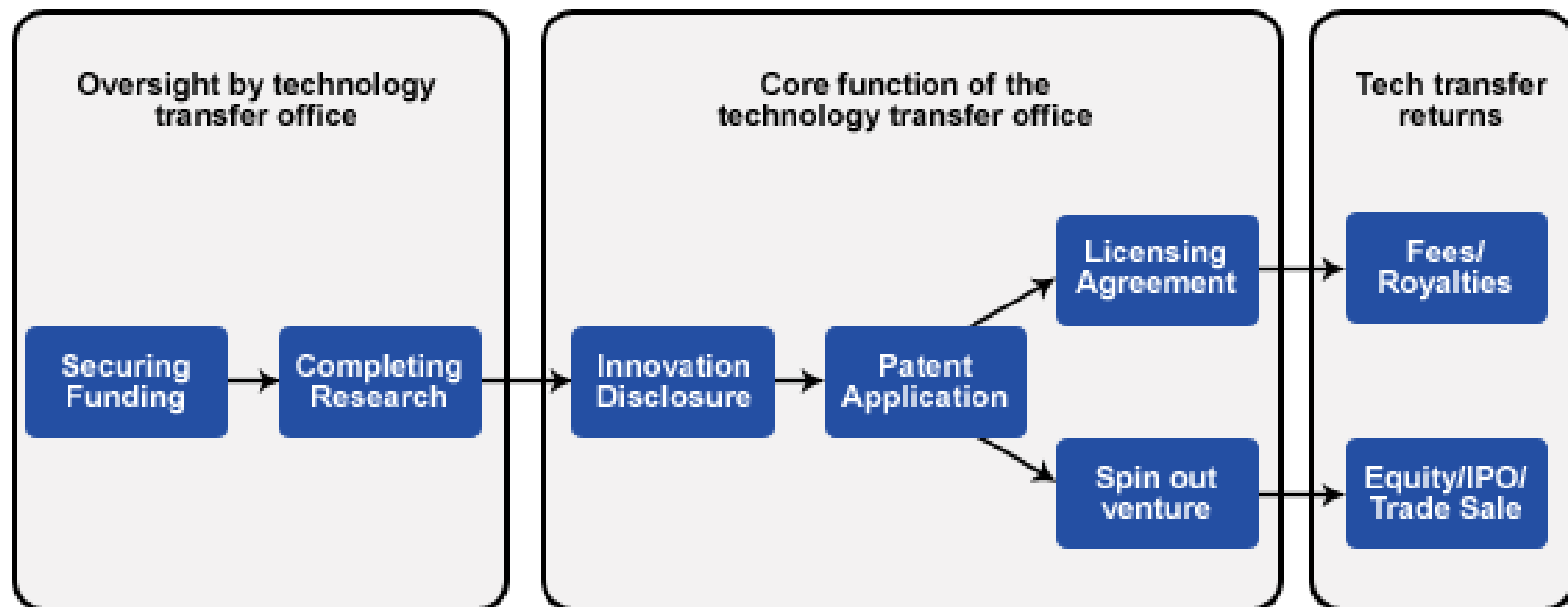
# Overview of the Technology Transfer Process



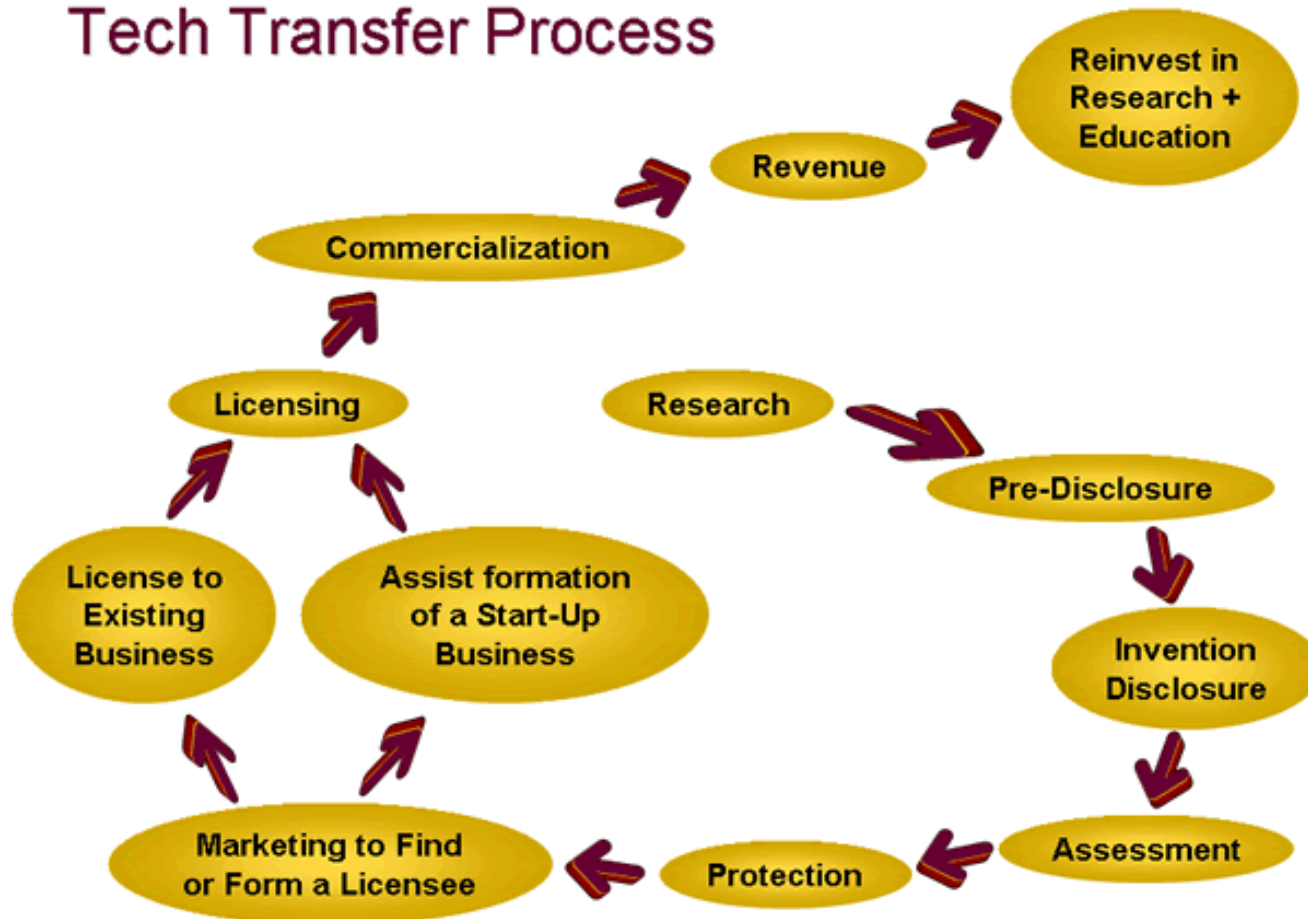
[NIH]

**Technology Transfer Process - The predefined steps taken by the research university to assert and protect its patent rights and to monetize inventions where possible. Steps in the process may include pre-disclosure, disclosure, assessment, protection, marketing, licensing, commercialization and revenue distribution.**

## The Tech Transfer Process

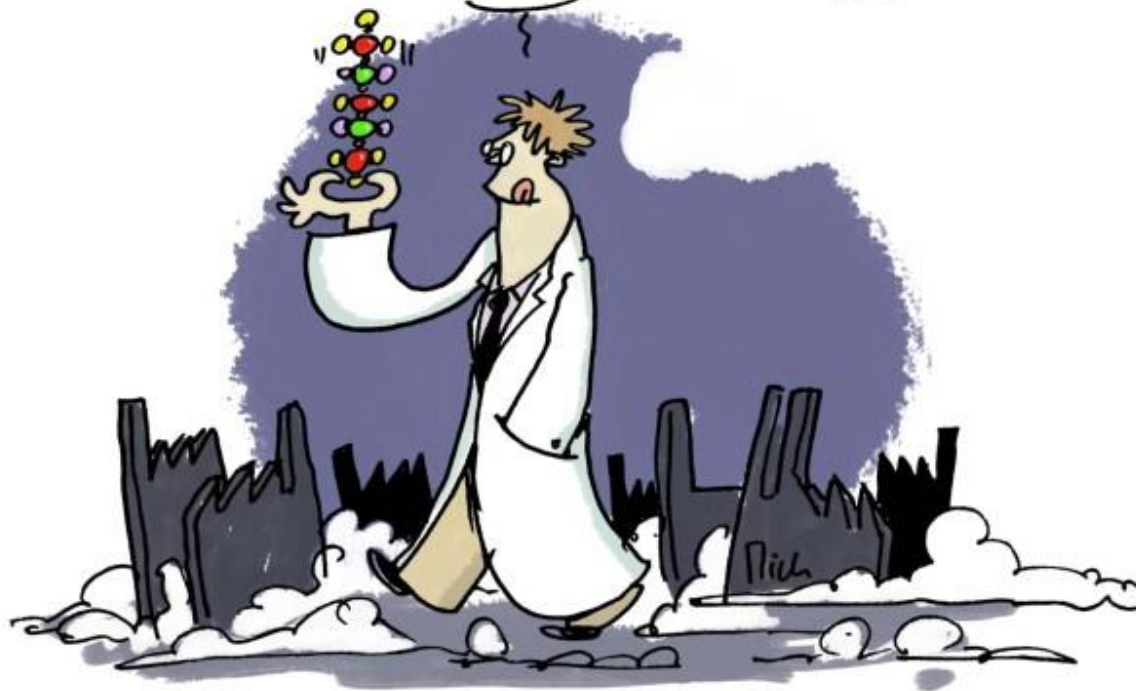


## Tech Transfer Process





TO COMMERCIALIZE  
OR NOT TO  
COMMERCIALIZE,  
THAT IS THE QUESTION ...

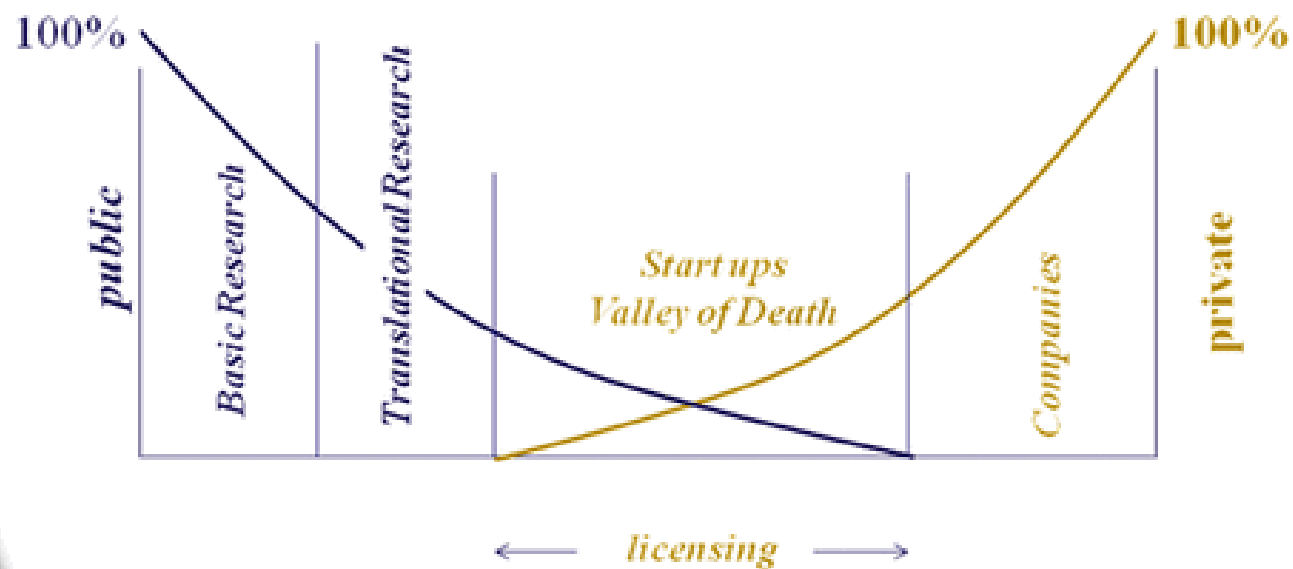


# The Future of Technology Transfer: Challenge and New Models



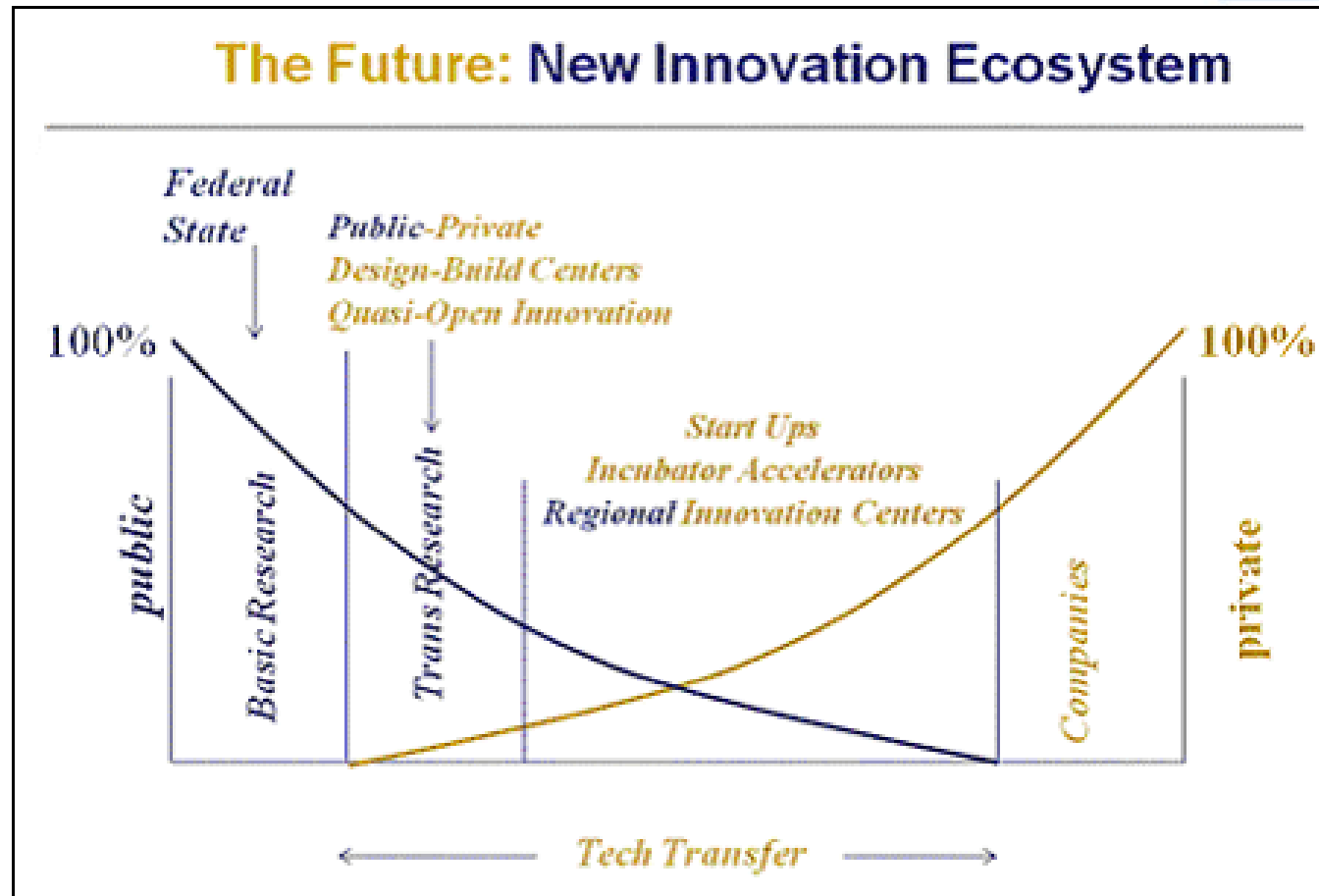
**Valley of Death: where good lab discoveries go to die because they lack the funding necessary to become a commercial product.**

## The Continuum of Innovation



**New model:** a public/private collaboration specifically around that area of translational research, and assistance to start-ups from incubators and innovation centers.

## The Future: New Innovation Ecosystem



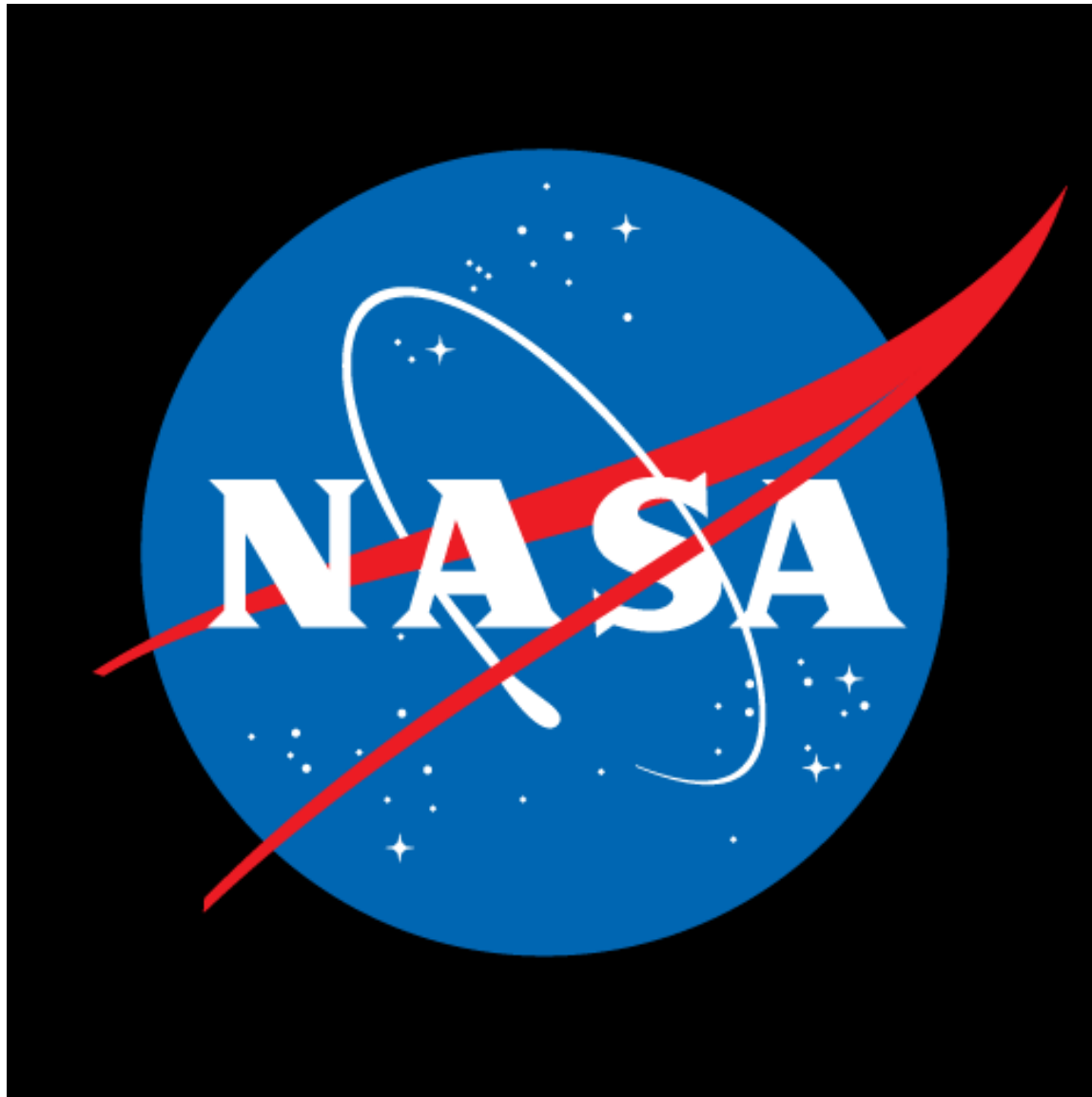
# US Federal Lab Technology Transfer

Examples:

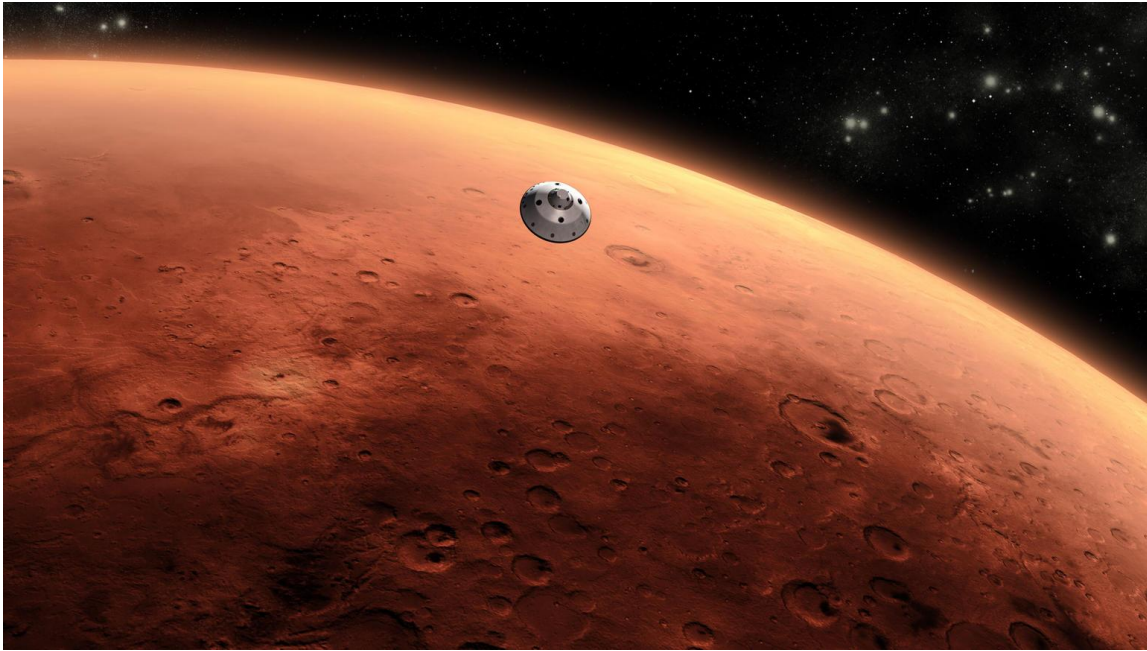
- FDA's Technology Transfer Program
- USDA Office of Technology Transfer (OTT)
- CDC Office of Technology and Innovation (OTI)
- NIH Office of Technology Transfer
- NASA - Office of the Chief Technologist

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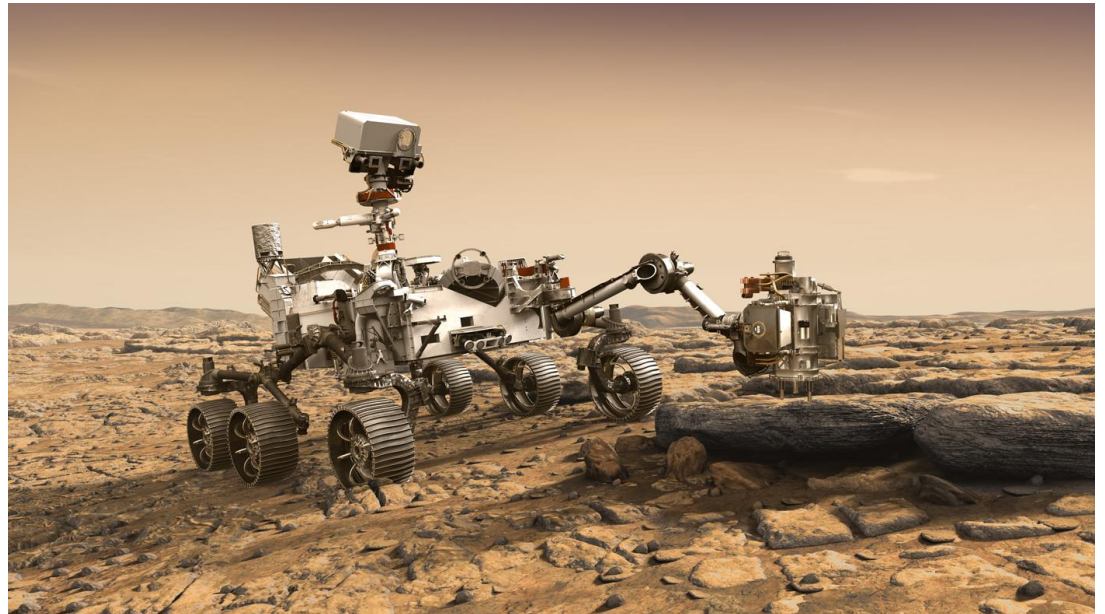
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TECHNOLOGY  
TRANSFER  
PROGRAM

BRINGING NASA TECHNOLOGY DOWN TO EARTH

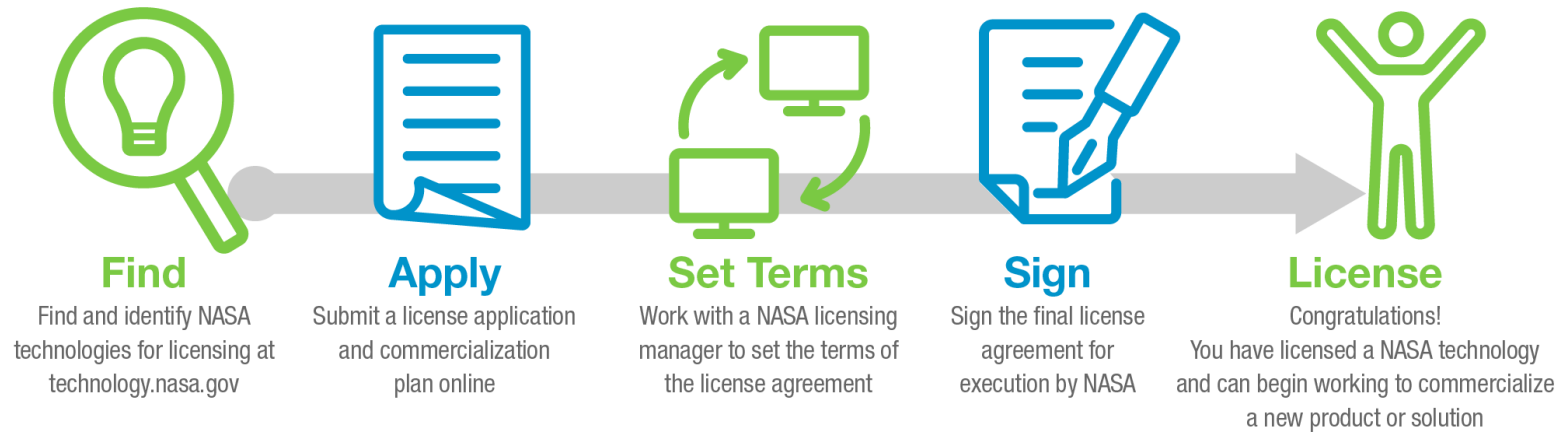


TECHNOLOGY  
GATEWAY

**NASA's Technology Transfer Program ensures that innovations developed for exploration and discovery are broadly available to the public, maximizing the benefit to the Nation. Whether you're looking to start a new company, enhance an existing product, or create a new product line, you can gain a competitive edge in the marketplace by putting NASA technology to work for you.**

<https://technology.nasa.gov/>

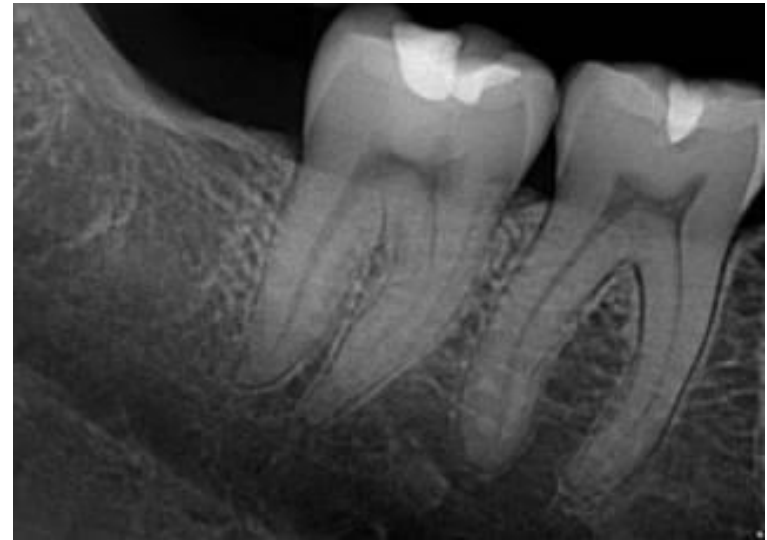
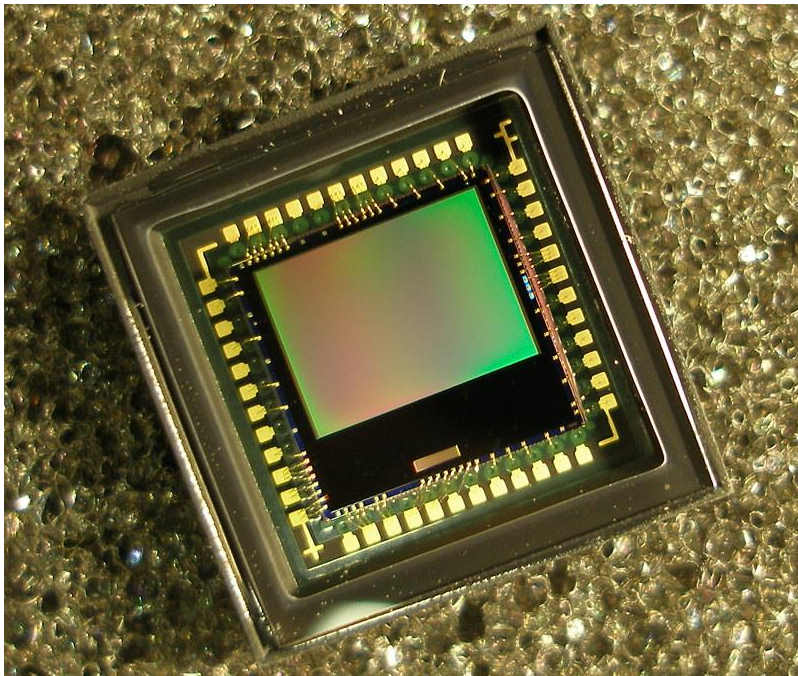
# How to License NASA Technology



NASA develops all sorts of technology to solve the tough challenges of exploring space, advancing the understanding of our home planet, and improving air transportation. Often, those same inventions have other untapped applications. Through patent licensing, those technologies can be transformed into commercial products and solutions that can give your business a competitive edge.



# The NASA Imager Dentists Use Daily



# NASA Prosthetics



# Laser eye surgery or laser vision correction



# Closing Thoughts





- **Technology transfer and commercialization CAN be compatible with, and in fact enhance, the traditional missions and roles of a university or research institute.**
- **Technology transfer and commercialization requires a dedicated effort to be successful**
- **The skills necessary for successful technology transfer and commercialization are different than the skills necessary to do good science.**
- **The research organization of the 21st century will be heavily involved in technology transfer.**

The United States is a mature innovation ecosystem. Developing countries should carefully consider their strategies for economic diversification, i.e., accelerating innovation/knowledge-driven development. **Direct emulation of the US system may not be an appropriate strategic approach.**

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**THANK  
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