

Technology Transfer Strategies

Examples from American Institutions

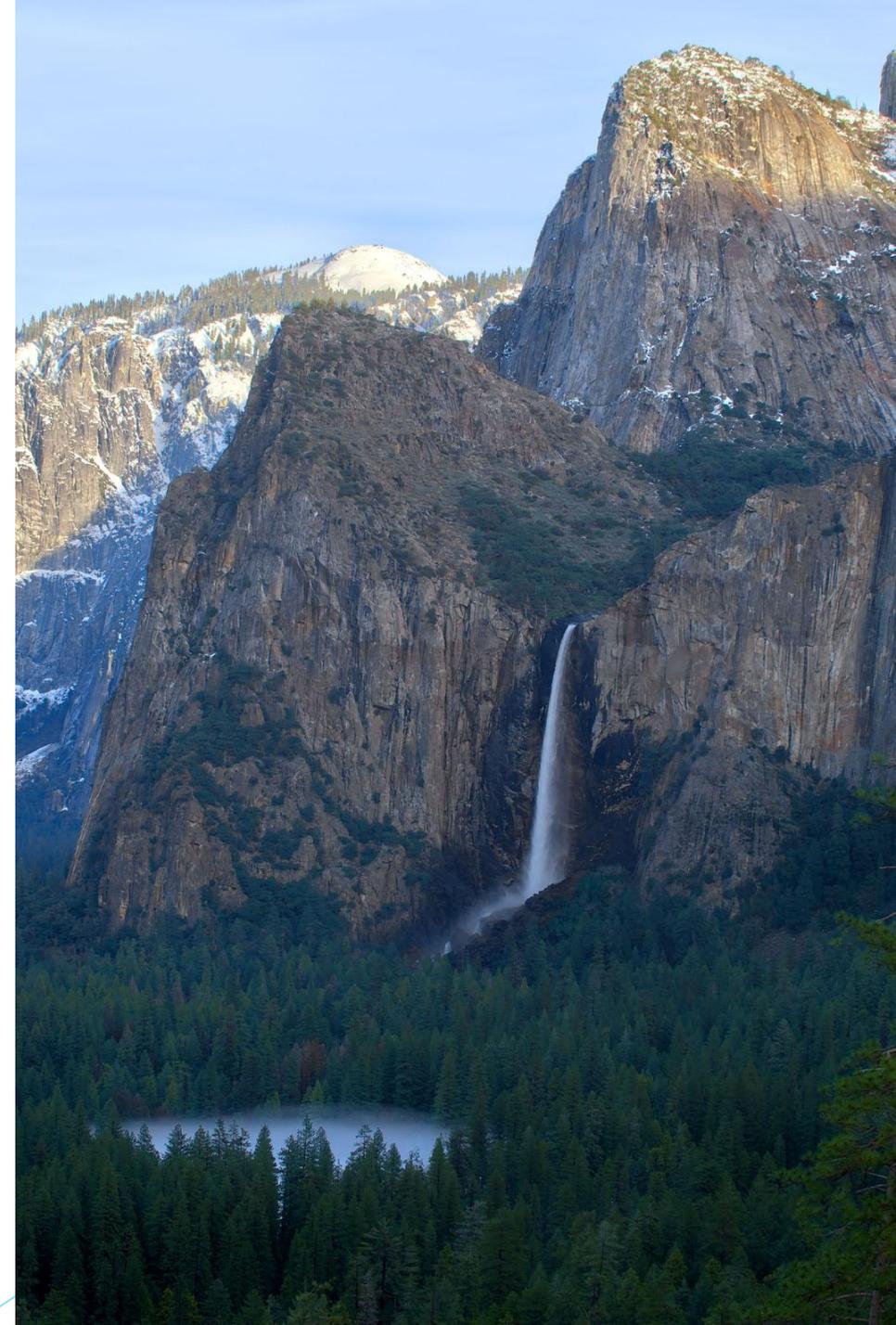
Kathleen Graham - June 7, 2017 - Polish Patent Office

Objectives for Today

- ▶ Share with you some best practices of US technology transfer
- ▶ Have a discussion with you about technology transfer issues you encounter
- ▶ Government research agencies conducting technology transfer in US
- ▶ Some university tech transfer examples
- ▶ First talk about intellectual property protection in the US
- ▶ Patenting
- ▶ US laws that allow for tech transfer of publicly-funded research
- ▶ Types of tech transfer agreements that we use at US government agencies

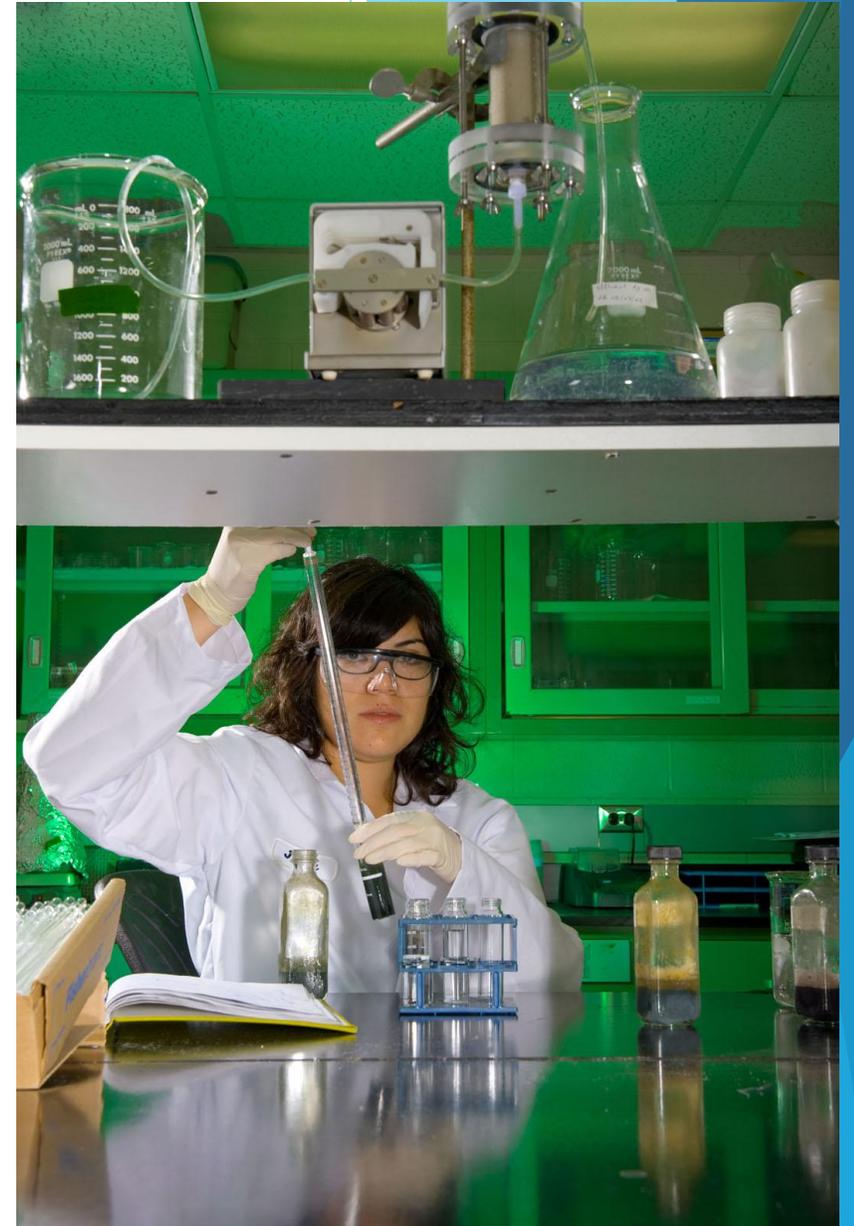
Introduction

- ▶ Kathleen Graham
- ▶ Technology Transfer Specialist for the US Environmental Protection Agency
- ▶ Facilitate collaborative research and development agreements between EPA scientists/engineers and external researchers (universities, businesses)
- ▶ Assist researchers in obtaining patents on new technologies
- ▶ License patented technologies to companies
- ▶ Track royalties from licenses
- ▶ Report on technology transfer metrics for the Agency
- ▶ Train EPA employees on protecting intellectual property, research collaboration
- ▶ Committee Chair of State and Local Government Committee for the Federal Laboratory Consortium of Technology Transfer (FLC)



Background on US EPA Technology Transfer Program

- ▶ As US government agencies go, our technology transfer program is small (compared with NASA or the Dept. of Energy for example)
- ▶ We develop technologies related to air monitoring or water testing, new drinking water treatment technologies
- ▶ Primarily a regulatory agency, so research is geared toward setting regulatory standards and determining “acceptable” limits
- ▶ ~40 active licenses on patented technologies
- ▶ 8 - 12 new inventions reported by Agency employees each year
- ▶ Bring in \$300K - \$800K USD in royalties on licensed technologies annually
- ▶ 25-50 new collaborative research agreements/year



Why Do US Government Agencies Transfer Technologies?

- ▶ To share/transfer property and research materials between research institutions - e.g., from a University laboratory to a government scientist
- ▶ Collaborate with outside research partners, to share expertise, and leverage research funds
- ▶ Protect federal intellectual property that is developed
- ▶ To promote public use and economic opportunity - get technologies developed within government laboratories into the market quickly
- ▶ Research agencies mandated to participate in technology transfer

How Do Government Agencies Conduct Technology Transfer

US Laws that Address Technology Transfer

- ▶ Bayh-Dole Act (1980)
 - ▶ Permits non-profit organizations and small businesses to retain title to inventions made with government funds (later extended to all government contractors and grantees)
 - ▶ Allows government owned and operated laboratories to grant patent licenses



How Do Government Agencies Conduct Technology Transfer (continued)

US Laws that Address Technology Transfer

- ▶ Stevenson-Wydler Act (1980) and Federal Technology Transfer Act (FTTA) - 1986
 - ▶ Provides private industry, state and local governments and academic institutions access to federal laboratories to collaborate on research and development projects
 - ▶ Allows government-employed inventors and government laboratories to share in royalties from licensed technologies.
 - ▶ Gets federally-funded technology into the marketplace.

IP Ownership for Contractors and Government Employee Inventors

- ▶ Contractors working for the government Agency keep their IP rights
 - ▶ US government, which paid for the work, retains a right to use the technology
 - ▶ If there is an “exceptional circumstance” then the government can compel the contractor to assign rights to the government
- ▶ Government employees who invent during the course of their duties assign patent rights to the US government
- ▶ US government can license the patented (or patent pending) technology to companies for commercialization
 - ▶ To make or have made, use, or further develop the technology
 - ▶ Negotiate royalties back to the government
 - ▶ Royalties are split between inventors and the laboratory

Treatment of Intellectual Property at a Government Agency

- ▶ Every employee has the responsibility to recognize and protect intellectual property (IP)
- ▶ IP is protected for the purpose of patenting, publishing, or further research
- ▶ Government employee IP is owned by his/her government employer (Same with universities - faculty inventors assign rights to their University in most cases)

Protecting IP From Premature Disclosure

- ▶ Mechanisms for staff to protect IP from premature disclosure
 - ▶ Put a non-disclosure agreement in place (also called confidentiality agreement)
 - ▶ Only publish or present information about the IP after a patent application has been filed
 - ▶ Do not disclose a colleague's work
- ▶ When publishing information about a patented or patent-pending technology, be sure to mention that the technology is protected and can only be used with permission

Addressing Premature Disclosure

- ▶ In US, you have 1 year to file a patent application after disclosure has occurred
- ▶ Provisional patents can be filed quickly, easily, and cheaply if a disclosure has just occurred or is about to occur (e.g., a presentation is approaching)
 - ▶ \$260 USD to file a provisional patent
 - ▶ Submit a packet of information to the USPTO - serves as a placeholder - not reviewed
 - ▶ Have 1 year to file the formal patent application in order to preserve the filing date of the original patent

Types of Technology Transfer Agreements

- ▶ Non-disclosure agreements
 - ▶ Protect sensitive information or IP during initial discussions for license or collaborative research agreement
- ▶ Cooperative Research and Development Agreements (CRADAs)
 - ▶ Collaborative research projects for specific research
 - ▶ Both parties contribute in-kind resources (staff time, facilities, materials, expertise)
 - ▶ Protect new and existing IP
 - ▶ Government Agency can accept funds for the project, but cannot give out funds
- ▶ Materials Transfer Agreements
 - ▶ Exchange of research materials only - no IP, no collaboration
- ▶ Materials CRADAs
 - ▶ Exchange of research materials with some collaboration
- ▶ Patent Licenses

Treatment of Proprietary Information Under FTTA Agreements

- ▶ Confidential Business Information from business collaborators can be protected from release under Freedom of Information Act requests by the public
- ▶ Specify under CRADAs which party will file a patent application on a jointly-developed invention under the agreement
 - ▶ That party pays for patent costs
 - ▶ If the other party wants to file patents in other countries, they can
 - ▶ Company partner (if applicable) gets option to an exclusive license on the technology if they are a co-inventor, or worked to further develop the technology

Filing for Patents in the US

- ▶ Provisional patents
 - ▶ Many US patents are first filed as provisional patents
 - ▶ Inexpensive
 - ▶ Place-holder until can file a full patent application
 - ▶ Something similar in Poland or PCT?
- ▶ Standard US patent applications
 - ▶ Patents typically issue 2-3 years after filing
 - ▶ Patents are in effect for 20 years after filing date
 - ▶ Costs (including hiring patent counsel for filing) \$12,000 - \$20,000 USD
 - ▶ Issuance fee due when patent issues; maintenance fees due 3.5, 7.5, 11.5 years
- ▶ Filing a PCT (or other foreign) application
 - ▶ Expensive, often not done unless known interest in that country
- ▶ Difficult to obtain a patent on software; sometimes copyrighted



Why Do US Government Agencies Patent Technologies?

- ▶ Promote public use and economic opportunity
- ▶ Prevent under-utilization
- ▶ Ensure technology is used properly
- ▶ Other benefits
 - ▶ Provides additional funding for further research
 - ▶ Rewards inventors

Patent Licenses

- ▶ License rights to government-owned technology for the purpose of commercialization
- ▶ Exclusive, non-exclusive, co-exclusive
- ▶ Research and government licenses
 - ▶ Not commercial licenses - can only be used for specific purposes
 - ▶ Royalty free
- ▶ Licenses negotiated by Technology Transfer staff and Laboratory where invention occurred
 - ▶ Individual inventors are not involved in discussions of license terms
- ▶ Patents can be enforced against infringers with the involvement of the US Department of Justice



Use of Provisional Patents to Gauge Interest in New Technologies

- ▶ Some universities and government agencies file provisional patents to see how much interest businesses will have in a technology
- ▶ For small fee, provisional patent can be filed to protect the technology for one year
- ▶ Use that time to “shop around” the technology - share information with relevant industry to see if there is potential interest in the technology
- ▶ If there is interest, then file a formal patent application
- ▶ Develop a license agreement with company on the technology

EPA Case Study - Hydraulic Hybrid Technology

- ▶ EPA's Vehicle and Fuel Technologies laboratory developed a new hybrid technology in which the energy created from braking is stored in a hydraulic fluid
- ▶ Particularly well suited for large, heavy vehicles - like delivery trucks
- ▶ EPA licensed the technology to a vehicle parts manufacturer
- ▶ UPS delivery company built several pilot delivery trucks around this technology to test on city streets



EPA Case Study - Microbial Source Tracking Technology

- ▶ EPA inventors developed a technology to identify animal sources of water contamination based upon DNA
- ▶ Can test for animals such as human, dog, pig, cow
- ▶ Benefit is that you can test water, detect contamination from animal sources (such as E. coli) and determine which animal it came from
- ▶ Look upstream to determine where that type of animal source is entering the water system
- ▶ Successfully licensed this technology to 3 commercial laboratories
- ▶ Licensed the technology to 4 state/local government laboratories (with additional licenses pending) - royalty free
- ▶ Numerous (>10) research licenses to universities for pure research (royalty free)
- ▶ Developed 2 new types of licenses - research and government - to accommodate the great interest in this technology, which can be very valuable to cities and states



Market Assessments

- ▶ Have experts evaluate invention to determine:
 - ▶ Market niche
 - ▶ How much of a change does the technology potentially bring to the market
 - ▶ Development costs to fully commercialize
 - ▶ Industry and companies with a potential interest
 - ▶ Country - regional interest in the technology
 - ▶ Costs to patent vs. how much \$ technology is likely to bring in
- ▶ Can also evaluate regional interest in a technology - look for possibility of partnering with regional economic development agency to help find a licensee

Outside Partnership Intermediary Evaluates Market Potential

- ▶ One model: Panel of experts to evaluate market potential for new technology
- ▶ Panel consists of industry experts, faculty inventor
- ▶ Evaluate how significant the technology is within that market
 - ▶ Who would buy this and why?
 - ▶ What is the potential business plan for this technology?
 - ▶ What are the potential customers doing now (without this technology)?
 - ▶ What is the regulatory environment?
 - ▶ Does this technology represent a big enough change in the market?

Outside Partnership Intermediary Evaluates Market Potential (continued)

- ▶ If promising technology, enlist someone in the relevant business community to shop the technology around
- ▶ If a company licenses it, then that person gets a percentage of the licensing deal
- ▶ If a start-up opportunity (e.g., the faculty inventor wants to start the company)
 - ▶ Evaluate its business plan
 - ▶ Cost to get it to market
 - ▶ How well it will attract experienced management to come on board

Robust University Tech Transfer Program

- ▶ University of Utah
- ▶ Large staff and considerable funding from endowment to develop large tech transfer program
- ▶ Conduct assessment of the invention first to determine whether they will go forward with patenting at all
 - ▶ 50% don't go forward with patent application at all
 - ▶ Encourage faculty to modify technology to better fit market if decide not to patent initially



Robust University Tech Transfer Program (continued)

- ▶ Technology transfer team developed around each technology
 - ▶ Tech management (licensing)
 - ▶ Investment management
 - ▶ IP (patents)
 - ▶ Legal
 - ▶ Market & events
 - ▶ Finance
- ▶ Market technology to businesses, or entrepreneurs/start-up companies
 - ▶ Sometimes faculty inventor wants to start company around his/her invention
 - ▶ Help development team to make best use of their funds and efforts (patenting, marketing, applying for external investment funds or grants)
- ▶ Options for each technology
 - ▶ Start-ups can apply for internal grants - associated with specific milestones and timeline
 - ▶ Internal accelerators and incubators

I-Corps Start-up Company Model

- ▶ I-Corps Model - various nodes set up with universities around the US
- ▶ A way to explore commercial potential of a technology
 - ▶ Something the university invented/owns
 - ▶ And/or something that students helped to invent
- ▶ Looking to determine if the technology
 - ▶ Has a viable market
 - ▶ Needs to be modified to better address the market need
 - ▶ Can better serve a different market with some tweaking
 - ▶ Is not viable

I-Corps Start-up Company Model (continued)

- ▶ Very immersive - discovery (interview process)
- ▶ Students are guided through the process with mentors (someone with prior experience in that field, or in a start-up), and faculty with entrepreneurship expertise
- ▶ Student teams (usually 3 people) conduct interviews - 100 in 2 months
- ▶ Students do the research to find the industry experts, companies to interview
- ▶ At the end, students often find out how much they still don't know
- ▶ Need to determine next step
 - ▶ Sometimes it is abandoning the technology
 - ▶ Some end up licensing the technologies and starting their own companies
 - ▶ Many do not

Long-term Industry Sponsors of University Research

- ▶ Universities often develop Master Research Agreements with major companies
 - ▶ University owns IP
 - ▶ Industry provides funding for long-term research in a given area of research - of interest to both the university and the company
 - ▶ Industry partner gets first look at new technologies developed under research using their funding. Would need to negotiate license with university still to acquire the technology
 - ▶ If the company decides not to license the technology, then university could market the technology to other companies
 - ▶ Work force development aspect for company sponsor - ready supply of highly-trained, specialized students that are looking for jobs when they graduate
 - ▶ Some universities - 10-15% of university research funded this way; some as much as 40%

Use of Competitions to Commercialize Government-Developed Technologies

- ▶ National Cancer Institute - Breast Cancer Challenge
- ▶ NCI develops cancer treatment technologies as a part of the US National Institutes of Health
- ▶ Decided to take a number of its promising, unlicensed technologies and challenge the broader community to develop businesses around the technologies
- ▶ Partnered with Avon Foundation, which provided funding to the winners, to sponsor challenge for student and entrepreneur teams
- ▶ Winning teams received funding (>\$100K USD each)
- ▶ Create a new channel to ignite university innovation and entrepreneurship
- ▶ Goals: Make an impact on breast cancer health; Stimulate regional economic growth by creating start-ups and jobs; Facilitate the transfer of Federal agency and AF grantee inventions to the private sector

Success Stories of Collaboration Between Local Gov't and Gov't Agencies

- ▶ EPA researchers with expertise in drinking water testing and remediation collaborated with local county
- ▶ Testing for lead in drinking water sources at childcare facilities and schools
- ▶ EPA provided expertise and assisted with analysis of water samples
- ▶ Local government conducted testing
- ▶ Local Foundation provided funding for the project
- ▶ EPA recommended specific remediation technologies for individual water sources where lead levels were high



Success Stories of Collaboration Between Local Gov't and Gov't Agencies

- ▶ Wildlife habitat bridge project
- ▶ In forested area of Washington State, US Forest Service researchers used data from GIS mapping, remote cameras, snow tracking, and roadkill locations
- ▶ Identified areas where human and animal transportation routes overlap
- ▶ Looked at historic migration areas and where habitat connectivity was a concern
- ▶ Collaborated with state highway planning team to develop two animal migration overpasses in a key areas
- ▶ Also developing three underpass areas around streams in critical locations



Thank you!

- ▶ Contact information
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- ▶ Please let me know if you would like additional information on anything I mentioned during our discussion today

For Discussion

- ▶ How are US patent laws different from those in Poland?
- ▶ How does Poland interact with PCT and patent laws of other countries?
- ▶ Examples of challenges encountered with technology transfer in Poland
- ▶ Areas of successful tech transfer in Poland
- ▶ What are some of the more innovative industries?
- ▶ What changes in law would help to make technology transfer more effective?
- ▶ Contemplating any changes in Polish patent laws?