

Researchers' Guide to Intellectual Property and Technology Transfer



**U.S.-CHINA CLEAN
ENERGY RESEARCH CENTER**

中美清洁能源联合研究中心

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A joint project of the US-China Clean Energy Research Center IP Experts Group.

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For more information, contact the CERC IP Experts Group. See www.us-china-cerc.org/Intellectual_Property.html or www.cerc.org.cn.

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Purpose of the Guide

This guide was prepared to answer questions that the research community working on U.S.-China Clean Energy Research Center (CERC) projects might ask. It provides a broad overview of the technology transfer process generally, with additional pointers and reminders specific to fulfilling CERC objectives, including that of commercial development of inventions that result from CERC research projects.

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Before You Research, Address Your Intellectual Property Issues

The U.S.-China Clean Energy Research Center (CERC) program can be distinguished from some other research programs by the fact that you, the researcher, are asked to consider the possibility of your creating intellectual property (IP) before you start your project. To that end, we have developed a simple checklist of considerations as you design your project and enter into agreements with others to work on your project.

- ☐ **Review the CERC IP and Technology Transfer Guide for Researchers** to learn about some of the key IP issues you should be aware of and may need to anticipate in your project agreements or IP-related contracts.
- ☐ **Remember that the Technology Management Plan (Regarding the Exploitation of Intellectual Property Rights) (“TMP”) is not a substitute for IP agreements.** To the extent that your project may develop IP, consider whether your project has appropriate agreements to address IP terms and conditions that comport with your consortium’s U.S.-China TMP.
- ☐ **Determine whether your project agreements or IP-related contracts allocate rights to participants in the project in accordance with your consortium’s TMP,** including, to the extent applicable, provisions to provide favorable terms to certain CERC participants or, if a joint U.S.-China project, appropriately address rights to participants in the “other” country.
- ☐ If your project involves Background IP, **determine whether your project has a mechanism for the declaration of that Background IP.**
- ☐ **Consult with your institution’s legal counsel or office of technology transfer** to ensure that you are comporting your agreements to all applicable laws (including the laws of both the United States and China) and that your institution’s policies are anticipating IP issues that may arise in the context of your project, managing your IP appropriately, and utilizing all related parties’ IP fully.

About CERC

What is the U.S.-China Clean Energy Research Center, or CERC?

CERC was established in November 2009 as one of the products that emerged from the Strategic and Economic Dialogue between the United States and China. In November 2014, the two countries agreed to extend CERC for another five years (2016-2020) with a broadened scope. The Protocol that created CERC was based substantially on the U.S.-China Agreement on Cooperation in Science & Technology of 1979. The Agreement and its 1991 amendment enabled an era of robust government-to-government science and technology cooperation, but CERC goes beyond that Agreement to fashion a new model of enhanced collaboration.

What are CERC goals?

In brief, the CERC goals are to:

- spur innovation of clean energy technologies
- diversify sources of energy supply
- improve energy efficiency
- accelerate transition to a low-carbon economy
- avoid the worst consequences of climate change

What are CERC's research focuses?

There are currently five research focus areas, each organized into a research consortium. From its founding, CERC research focus areas included:

- Advanced Coal Technology
- Clean Vehicles
- Building Energy Efficiency

When CERC was extended in November 2014, the Water Energy Technologies consortium (WET) was added. CERC is also establishing a consortium to address the energy efficiency of large and medium-sized trucks. Additional areas of research may be added in the future.

How does CERC conduct its research and development?

CERC is best understood as a virtual, rather than a physical, research center. It conducts research and development and related technology transfer activities through research consortia organized around research focus areas. Participants include premier institutions and industrial partners in both countries. Each consortium is directed by two Lead Institutions, one from each country.

How is the CERC model different from traditional cooperation?

In the traditional form of science and technology cooperation, institutions on each side work independently on research projects according to their own strengths, with research progress and results being shared externally via collegial but often academic interactions and exchange.

CERC represents a new model of enhanced interdependent collaboration, not just collegial cooperation. Under CERC, it is intended that research projects are undertaken together under jointly developed work plans.

This new model of collaboration is expected to enhance the prospect of joint development of clean energy-related IP from research through commercialization, but in order to do so, a strong, flexible framework for bilateral support for IP protection and utilization is required.

What assistance and resources are available to the inventor through CERC?

The CERC IP Experts Group include experts in IP law and practice in China and the United States who can help you with IP concerns in your project, including addressing questions you may have about IP creation, protection, exploitation, and management, or finding the right resources to bring your project to fruition, especially with regard to IP matters. For more information on the CERC IP Experts Group, see www.us-china-cerc.org/Intellectual_Property.html.

The CERC IP Framework



How does the CERC IP framework achieve bilateral support for IP?

The CERC IP framework is a primary feature to help achieve the new model of enhanced collaboration. It is a strong, flexible framework for protecting and sharing IP on commercial terms, and it encourages participants to address IP issues up front. Both the U.S. and Chinese governments have endorsed the framework, which enables effective oversight and encourages compliance. The CERC IP framework consists of the IP Annex to the Protocol establishing CERC and the Technology Management Plans (TMPs) adopted thereunder. There is one TMP for each research consortium, but the TMPs are for practical purposes identical. The CERC IP framework envisions a more flexible international IP regime than that under the U.S.-China Agreement on Cooperation in Science & Technology, notably, the IP Annex and TMPs provide 'a right' to each country to exploit jointly created IP.

What does the CERC IP framework do?

The framework ensures there is flexibility to set forth the terms and conditions for the protection of Background IP and for the allocation of Project IP in contracts. The framework encourages explicit IP agreements to address both Background IP and Project IP. The framework ensures IP can get protected the way it should, under prevailing laws of the United States or China or elsewhere in the

world. The framework sets out parameters for allocating and protecting rights to new inventions.

How does the CERC IP framework foster sharing and dissemination of research data and information?

CERC aims to encourage the widest dissemination of scientific information generated in CERC research activities. CERC does not prevent publishing research results in scientific or technical journals or books. While the TMPs require the two countries to make regular publicly available reports to each other on data and information relating to CERC projects, the TMPs allow for protection of confidential information.

How does the framework work with my country's IP laws and my organization's IP policies and practices?

Aside from the guiding rules described with regard to rights to Project IP or the protection and sharing of Background IP (described below), the CERC Protocol does not change the allocation of IP among or between rights owners, or between either country's government and its nationals in accordance with that country's laws or regulations. The framework ensures owners of IP and those interested in exploiting such IP (whether

Project IP or Background IP) can negotiate contract terms at arm's length on commercial terms.

This sharing mechanism of CERC IP is, however, still subject to domestic laws that may exist to prevent or prohibit disclosure of certain information or data across borders or to foreign nationals. In addition, the CERC IP framework does not prevent a participant from classifying certain information or technology as "business confidential" in accordance with respective laws and limiting or restricting access to such information or technology to only certain CERC participants, who will be expected to abide by confidentiality obligations.

How does the framework address rights to CERC Project IP?

As an overview of the framework, the CERC IP framework stipulates:

- Inventorship/authorship within each country is to be determined in a manner consistent with applicable laws of each country.
- To the extent consistent with the applicable laws, the inventor of Project IP (or as a practical matter, more likely the employer of the inventor in accordance with the employment agreement), is the owner of the Project IP. (See: "Who owns what I create?" on page 16.)
- If Project IP is the product of a CERC 'Jointly Funded Research Project' (i.e., US-China) CERC Project, and it is invented jointly by the inventors from each country, then it is jointly owned by the inventors (or their employers), unless otherwise agreed by rights owners from both countries, and each rights owner has the right to exploit the IP within their respective territory. Rights outside their respective territory are to be determined through mutual agreement of rights owners as provided for in the TMP.
- In the case of IP created in CERC Projects that are not 'Jointly Funded Research Projects,' CERC participants in the same consortium but from the 'other' country have the right to obtain a license to use the Project IP for the purpose of undertaking R&D. This 'right to license' does not apply to trade secrets.
- In certain circumstances, CERC participants are entitled to preferential licensing to CERC Project IP as set forth in the TMP.

Given the complexity of ownership of IP, the allocation of rights and responsibilities among IP owners, and licensing matters, it is strongly advised that participants address ownership rights and responsibilities and licensing matters *before a project starts*. Discuss this with your institution's IP or technology transfer specialists or other legal counsel.

How does the framework protect Background IP?

Owners of Background IP retain all rights, titles, and interest. The owners are not required to license, assign, or otherwise transfer Background IP to other participants but may do so in the context of an appropriate license setting forth the terms and conditions. Prior to the beginning of a project, it is important to carefully describe the scope and nature of Background IP and to have any contributor (or licensor) of Background IP acknowledge such in writing.

What if we made improvements to Background IP?

The use of Background IP in a CERC research project may well result in improvements (or "subsequent developments," as they may be called) to such Background IP. Participants in the CERC research project may make provisions to allocate rights in such improvements in a Project Annex, project agreement, or IP agreement. Otherwise, ownership of such improvements belongs to the inventor of the improvement, or more likely the employer of the inventor is the assignee of such rights. Often, the Background IP's owner will desire an agreement for rights to any such improvements, whether by conveying ownership or through a license to use. In some countries, including China, such attempts to grant back rights to improvements may raise unfair competition law concerns.

Background IP owners do not usually own the improvements derived from it. In China, as in the United States, unless otherwise agreed by the parties, improvements are by law owned by the party who made or created the improvements. To acquire ownership to such improvements requires a specific agreement and consideration to be paid. Despite that vesting of ownership by law, the developer's

right to use such improvements is further subject to various other laws and regulations.

Rights allocation regarding improvements can be complicated and should be addressed thoughtfully. Since improvements made during the course of CERC research activities may well be Project IP and therefore subject to the terms of the TMP for your CERC research consortium, you should seek assistance from your institution's IP or technology transfer specialists or other legal counsel.

As a matter of good practice in all research projects, researchers should maintain clear notebooks to describe the work done with Background IP in a manner that will help identify and distinguish improvements made to the Background IP.

What if the Background IP owner made improvements outside of CERC?

Even if Background IP is contributed to a CERC research project, the owner may still be performing further research and development on that Background IP (outside of the CERC context) that could result in improvements. Participants in the CERC research project may make provisions to license or, if relevant, allocate rights in such improvements in a

Project Annex, project agreement, or IP agreement. This may or may not involve an agreement from the Background IP owner to license such improvements made outside CERC to the CERC research project.

As noted above, issues surrounding ownership and the right to use improvements are often complicated. You should seek assistance from your institution's IP or technology transfer specialists (and, if circumstances require, discuss your situation with the Lead Institutions).

Can I/we apply for national and/or international technology standards based on CERC research results?

Yes, but the research results must have been patented or otherwise appropriately protected.

Are there any national laws that would affect how CERC IP is allocated?

Yes. In addition to the more obvious ones governing IP, other laws in the United States and China may apply. The following table identifies some of the laws or regulations in each country that may have an effect on how CERC IP is allocated.

Relevant Laws

United States	China
Laws concerning IP or intangible assets:	
- Patent Act (federal) - Copyright Act (federal) - Lanham Act on Trademarks (federal) - trade secret laws (individual state laws and the Uniform Trade Secrets Act)	- Patent Law and its Implementing Rules - Copyright Law and its Implementing Rules - Trademark Law and its Implementing Rules - Law of the People's Republic of China (PRC) on Promoting the Transformation of Scientific and Technological Achievements - rules on employment invention (draft)
Laws concerning business arrangements and business conduct:	
- contract law (individual state laws) - the Uniform Commercial Code (as adopted by individual states) (which would affect the registration and recordal of security interests over intangible assets) - anti-trust law (federal) - Foreign Corrupt Practices Act (anti-bribery) - Economic Espionage Act of 1996	- contract law - Law for Countering Unfair Competition - anti-monopoly law - anti-bribery laws and regulations (dispersed among various laws and regulations)
Laws concerning establishment and existence of business corporations:	
company law (individual state laws)	- company law - foreign investment laws and regulations
Laws concerning import and export of technology, and national security:	
Export Control on Dual-Use Technology (federal)	- Foreign Trade Law - Technology Import and Export Administration Regulations - Law on Guarding State Secrets
Laws concerning government-funded research and governmental rights to inventions:	
- Bayh-Dole Act (federal) - Federal Acquisition Regulations	- Projects - Law on Science and Technology Progress

Will the U.S. or China government have rights to my inventions?

To the extent that projects are government-funded, laws or rules may operate to create or otherwise fashion certain government rights in IP.

In the United States, the Bayh-Dole Act was adopted in 1980 with the aim of promoting the utilization of inventions arising from federally funded research and development. Under the Bayh-Dole Act, academic or research institutions (and small businesses and eventually, under other authority, most large

businesses) may elect to retain ownership rights to inventions resulting from federally funded research if certain conditions are met. These conditions or obligations include, among other things, taking effective steps to protect (when appropriate) and to develop the inventions into some practical or commercial application.

The federal government of United States, however, reserves certain rights even when the inventor has retained ownership (or more likely, when the inventor's employer has been assigned ownership rights). First, the federal government retains a free non-

exclusive license to use the invention by or on behalf of the U.S. government and can, under certain limited circumstances, “march-in” to require the inventor to grant a license to another party to develop the invention into a practical application or to alleviate health and safety needs. That said, to our knowledge, the Federal Government has never exercised this “march-in” right in the 30 or so years since the adoption of the Bayh-Dole Act.

The inventor does have the right and freedom to license the invention to another party for development or commercialization, but any products embodying the invention or produced through the use of the invention should be manufactured substantially in the United States. (This U.S. manufacture requirement may be waived if there is otherwise some tangible alternative benefit to the U.S. economy.)

In China, too, some laws and rules operate to provide government rights to inventions from government-funded research. For example, PRC Patent Law Article 14 provides that, if an invention patent of a state-owned enterprise or a state-owned institution (which may be a China university, research institution, etc.) is of great significance to national or public interest, the state may approve designated units to exploit the patent, and said units shall pay royalties to the patentee in accordance with state regulations. Further, the Law on Science and Technology Progress Article 20

provides that the state may direct or designate some third parties to practice or implement an invention patent that results from research projects funded with government financial support if the invention is of great significance to national or public interest or is not being implemented within a reasonable time period.

Despite apparent differences, the U.S. and China rules on government rights to invention have thus far been implemented in a similar manner.

How should CERC IP-related disputes get resolved?

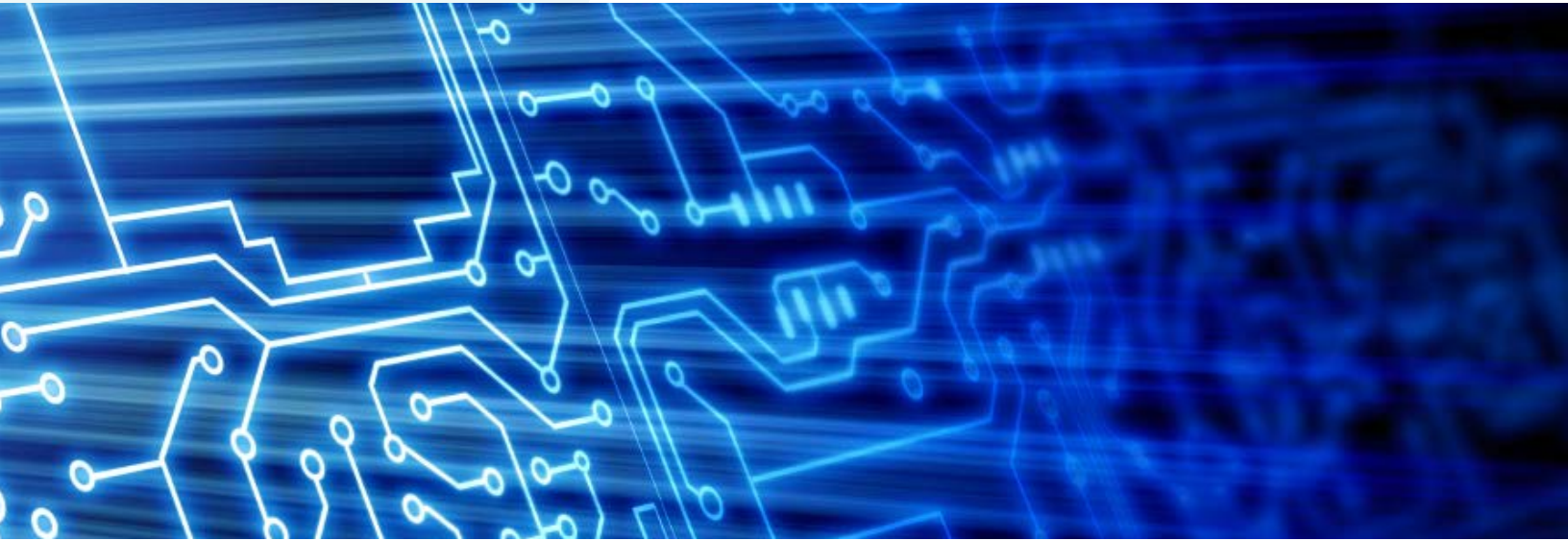
CERC supports fair dispute resolution under international standards. Participants should first bring their disputes to the attention of the respective governments for possible resolution. Where that fails or is not appropriate, it is envisioned that disputes will be resolved through arbitration in accordance with internationally recognized arbitration rules and procedures.

In your Project Annex, project agreement, or IP agreement, you should provide for a dispute resolution process and select the applicable law and venue. Contact your institution’s IP or technology transfer specialists or outside legal counsel. They can help you draft the appropriate dispute resolution contractual provisions.





Technology Transfer



What is technology transfer?

Generally, technology transfer is the transfer of knowledge and inventions from one entity to another, or an even wider dissemination to the public. Likely vehicles for technology transfer are publications, educated students entering the workforce, exchanges at conferences, relationships with industry, etc.

More specifically, technology transfer often refers to the process in which the inventor or owner transfers certain technology through sale or licensing of IP, consigning such technology to another party for further research and development or exploitation.

How does technology transfer lead to commercialization of inventions?

Technology is typically transferred through a license agreement in which the owner of the IP grants IP rights in the defined technology to the licensee for a period of years, often limited to a particular field of use and/or region of the world. The licensee thereby gains the right to use and to further develop the technology.

The licensee may be an established company or a new business start-up. Licenses usually include terms that require the licensee to meet certain performance obligations and to make financial payments to the IP owner.

Many academic institutions have a service unit composed of licensing, business development, and legal specialists who are experienced in technology transfer. Similarly, U.S. national laboratories may also have professionals who work with researchers on these matters.

Why should I want to commercialize inventions?

The reasons are unique to each researcher and may include:

- making a positive impact on society
- feeling a sense of personal fulfillment
- achieving recognition and financial rewards
- generating additional laboratory or departmental funding
- meeting the obligations of a research contract
- attracting research sponsors
- creating educational opportunities for students
- linking students to future job opportunities

Commercializing inventions made through CERC research activities may help achieve the CERC objective of having a favorable impact on the environment.

What are the typical steps in the technology transfer process from research to commercialization?

The typical steps are as follows:

- research
- pre-disclosure (within the institution, not to the public)
- invention disclosure (within the institution, not to the public)
- assessment
- protecting the IP; deciding which form of IP protection to procure
- marketing the technology; identifying candidates to bring the technology to market
- commercialization

How does the CERC context affect the technology transfer process?

CERC does not displace the normal technology transfer process, but it is intended to foster collaboration among participating institutions and industry partners in the technology transfer process.

How long does the technology transfer process take?

The process of protecting the technology and finding the right licensing partner may take months—or even years—to complete. The amount of time will depend on the development stage of the technology, the market for the technology, competing technologies, the amount of work needed to bring a new concept to market-ready status, and the resources and willingness of the licensees and the inventors.

How can I help in this process? *IMPORTANT*

Contact your institution's IP or technology transfer specialists when you believe you have created or discovered something unique with potential commercial or research value.

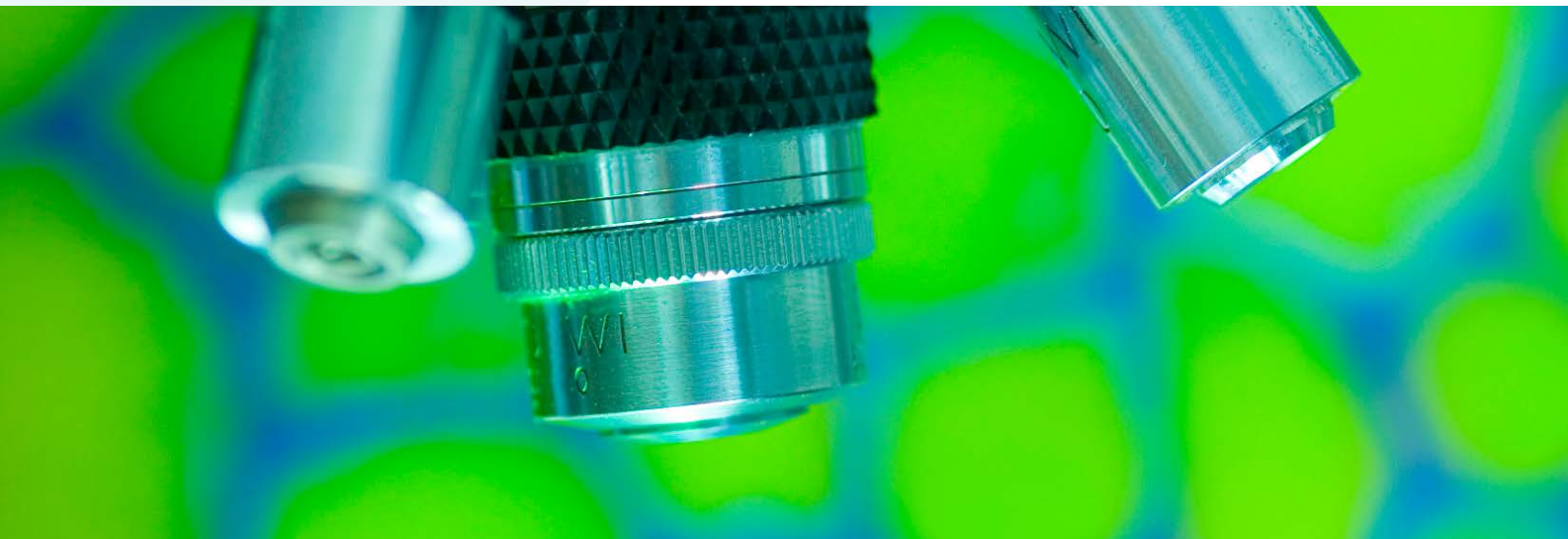
Work with your institution's IP or technology transfer specialists (and the Lead Institutions, if circumstances require) before publicly disclosing your technology or submitting a manuscript for review and publication. This is critical to avoid risking your patent rights and possibly hindering the opportunity to market your invention. When you discuss your research with your institution's IP or technology transfer specialists (and the Lead Institutions, if circumstances require), make sure to identify CERC industry partners or other companies and contacts you believe might be interested in your invention or who may have already contacted you about your invention.

Respond to your institution's IP or technology transfer specialists (and the Lead Institutions, if circumstances require) and outside patent counsels when they approach you for information or for action.

Keep your institution's IP or technology transfer specialists (and the Lead Institutions, if circumstances require) informed of upcoming publications or interactions with CERC industry partners or other companies related to your IP.



Research Considerations



Will I be able to publish the results of my research and still protect the commercial value of my IP?

Yes, but since patent rights are affected by these activities, it is best to submit an Invention Disclosure to your institution first.

Early publication can affect a potential patent. Once publicly disclosed (published or presented in some form), an invention may have restricted or minimal potential for patent protection. This would be true for most countries, including China. For example, in China, disclosure to individuals outside of your organization will result in losing the novelty of your invention, and you will not be able to obtain a patent. U.S. law does offer a grace period if some conditions are met, but it is better to err on the side of caution to safeguard patentability of any invention.

Do inform your institution's IP or technology transfer specialists of any imminent or prior presentation, lecture, poster, abstract, website description, research proposal submission, dissertation/master's thesis, publication, or other public presentation that includes the invention.

May I use material or IP from others in my research?

Yes, but it is important to document carefully the date and conditions of use so that the ownership rights of subsequent research results are not impaired. If you wish to obtain materials from outside collaborators, your institution may have an incoming Material Transfer Agreement (MTA) that should be completed. In some cases, you may have to obtain a license to use that material through a license agreement.

The CERC IP framework provides for the possibility of using Background IP. Anyone bringing Background IP to a CERC project should document in writing the scope and nature of Background IP prior to the beginning of use. Consult your institution's IP or technology transfer specialists if you have questions.

Will I be able to share materials, research tools, or IP with others to further their research?

Yes. However, it is important to document items that are to be shared with others and the conditions of use. If you wish to send materials to an outside collaborator, your institution may have an outgoing MTA that should be completed for this purpose. It also may be necessary to have a Confidentiality Agreement, or a Non-Disclosure Agreement (NDA),

completed to protect your research results or IP. Contact your institution's IP or technology transfer specialists to assist you in completing outgoing MTAs or NDAs.

What rights does a research sponsor have to any inventions associated with my research?

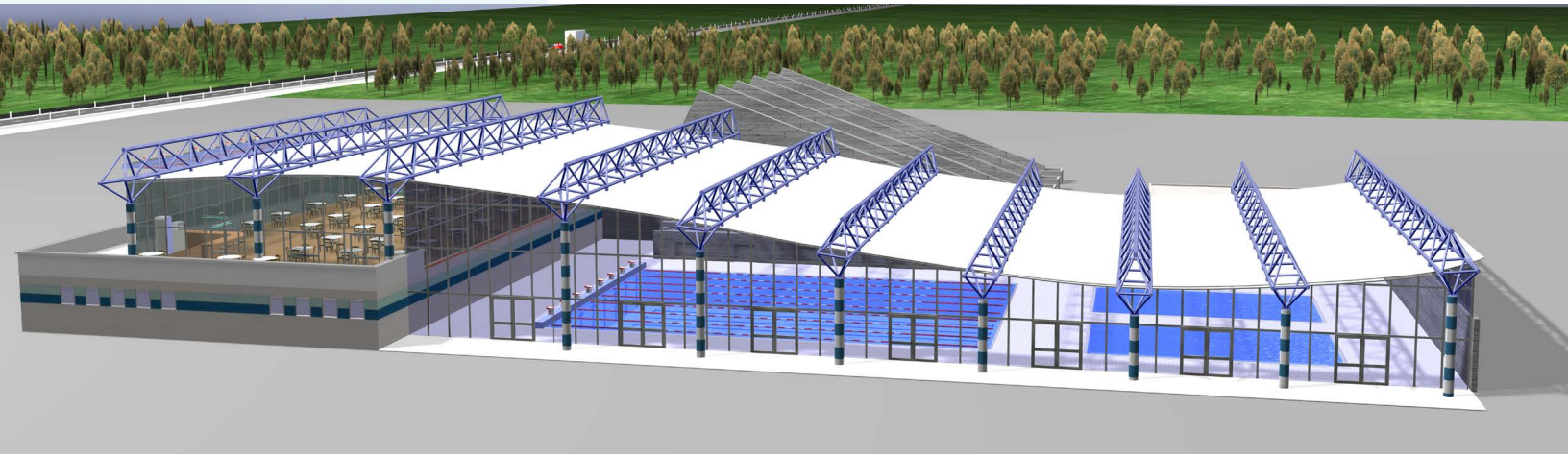
The agreement you and your institution have with any research sponsor should specify the sponsor's rights in the future and possible IP. Your institution generally retains ownership of the patent rights and other IP resulting from sponsored research. However, the sponsor may have rights to the IP or to obtain a license to the defined and expected outcomes of the research. Often, sponsored research contracts allow the sponsor a limited time to negotiate a license for any patent or IP rights developed as the result of the research. Even so, the sponsor generally will not have contractual rights to inventions that are clearly outside of the scope of the research. Therefore, it is important to define the scope of work within a research agreement. You should consult your institution's IP or technology transfer specialists if you have questions regarding sponsored research.

What if I created the invention with someone from another institution or company?

If you created the invention under a sponsored research or consulting agreement with a company, your institution's IP or technology transfer specialists will need to review that contract to determine ownership and other rights associated with the contract and to determine the appropriate next steps. Should the technology be jointly owned with another academic institution, both institutions may enter into an inter-institutional agreement that provides for one of the institutions to take the lead in protecting and licensing the invention, sharing of expenses associated with the patenting process, and allocating any licensing revenues. If the technology is jointly owned with another company, your institution's IP or technology transfer specialists will work with the company to determine the appropriate patenting and licensing strategy.



Technology Disclosures (also called Invention Disclosures)



What is an Invention or Technology Disclosure ?

A Technology Disclosure (also called an Invention Disclosure) is a description of your invention or development. The disclosure should also list all sponsors of the research and should include any other information necessary to begin pursuing protection and commercialization activities. It is critical that you note the date of any upcoming publication or other public disclosure describing the invention. To initiate the process, you should make contact with your institution's IP or technology transfer specialists.

A Technology Disclosure should be treated as "confidential" in accordance with your institution's policy in order to prevent inadvertent disclosure that could affect patentability of the technology.

How do I know if my discovery is an invention? Should I be submitting a Technology Disclosure?

You are encouraged to submit a Technology Disclosure for all developments that you feel may solve a significant problem and/or have significant value. If you are in doubt, contact your institution's IP or technology transfer specialists to discuss the potential invention.

Why should I submit a Technology Disclosure?

When you disclose your invention to your institution, it starts a process that could lead to the commercialization of your technology that could ultimately help achieve CERC objectives. This process may involve beginning the legal protection process and working to identify CERC industry partners or other development partners to further develop the technology. If government funds were used in your research, you are probably required to file a prompt disclosure with the sponsoring agency. Similar requirements may exist for other sponsored projects.

When should I submit a Technology Disclosure?

You should complete a Technology Disclosure whenever you feel you have discovered something unique with possible commercial value. This should be done well before presenting the invention through publications, poster sessions, conferences, press releases, or other communications. Once publicly disclosed (i.e., published or presented in some form), an invention may have restricted or minimal potential for patent protection, especially for countries other than the United States.

Should I disclose research tools?

Typically, research tools are materials that are used as “tools” in the research process. Research tools do not necessarily need to be protected by patents in order to be licensed to other researchers or industry partners for use or further development. Some research tools (such as new separation or fabrication processes), however, may need to be patented so that a company will invest in the engineering development to make the tools broadly useful. If you have research tools that you believe

to be valuable, contact your institution’s IP or technology transfer specialists, and they will work with you to develop the appropriate protection, licensing, and distribution strategy that will preserve the research tool’s commercial value.

How do I submit a Technology Disclosure?

You should follow your institution’s policy.



Assessment of a Technology Disclosure



How will a Technology Disclosure be assessed?

Technology Disclosures will be examined to assess a number of factors, including:

- novelty of the invention
- competing technologies/products
- protectability and marketability of potential products or services
- relationship to related IP
- size and growth potential of the relevant market
- amount of time and money required for further development
- pre-existing rights associated with the IP underlying the invention

This assessment will include consideration of which existing industry partner within the consortium may be best to further develop the invention, whether a new industry partner should be found, or whether a new business start-up should be the basis for the invention's further development.

If we/I believe that all IP should be licensed non-exclusively or, if software, as open-source to all potential users for the public good, will the institution honor our/my request?

Your institution's IP or technology transfer specialists will work with you to develop the appropriate commercialization strategy for the invention. Some technologies lend themselves to non-exclusive licensing (licensing to more than one licensee) or open-source licensing, while others are bound by governmental or institutional policies and other obligations.

Is an invention ever re-assigned to an inventor by an institution?

Yes, it could happen. If your institution decides not to pursue patent protection and/or chooses not to actively market the invention, and there is no applicable prohibition or restriction, the institution may re-assign rights of ownership to the inventor(s). Among the key factors in deciding to re-assign are whether additional institutional resources or private resources could best improve marketability.

It should be noted that reassignment of inventions funded by government sources typically will require government approval. For China-funded projects (or Jointly Funded Research Projects for which China is one of the sponsors), any reassignment of inventions that involves state ownership interest must proceed only after clearance with China's laws and regulations on the disposition of state-owned assets. It may also be necessary to seek the approval or consent from relevant authorities. Failure to do so may result in criminal liability.



Ownership of Intellectual Property



What is intellectual property, or IP?

When CERC was created, the intent was to adopt and follow the same extensive scope as described in Article 2 of the Convention Establishing the World Intellectual Property Organization. In short, for CERC, the term IP refers to any subject matter that may be protected under the patent, trademark, and/or copyright laws or protected as a trade secret. This could include inventions or any publications or know-how, for example.

Who owns what I create?

Generally, ownership depends on several factors, including on the employment status of the creators of the invention and the extent of use of the employer's facilities in creating the invention. Employers in the United States often require employees to assign over all such creations by contract as part of the employment terms. In China, for employment invention-creation, normally, the university-employer automatically "at law" obtains the right to apply for a patent and owns other intellectual property. As a result, the employer generally owns the inventions made by its employees while they are acting within the scope of their employment or using the employer's facilities or resources. In some cases, the terms of a Sponsored Research Agreement or Materials Transfer Agreement (MTA) may affect ownership.

Whether in the United States or in China, the law generally does not prevent or forbid the employer from (re-)assigning to or sharing with the employee the intellectual property that automatically becomes employer owned. Your institution probably already has in place existing policies on ownership (or authorship) created or conceived within the scope of employment. There are, however, some important differences between the United States and China regarding employment/service invention. In addition, China is about to enact "rules on employment invention" (also referred to as rules on "Service Inventions") and Patent Law amendment with regard to the laws and practices on employment invention that are expected to evolve over the coming years.

Under the CERC IP framework, if your CERC research project is funded/sponsored/conducted by one side only (either the United States or China), your institution will probably own that invention. However, if the CERC project is a joint project, the resulting IP will be jointly owned by the institutions jointly participating in that research. If you are in doubt about ownership, you should contact your institution's IP or technology transfer specialists. (For Jointly Funded Research Projects, circumstances may also require you to contact the Lead Institutions.)

Who owns rights to inventions made while I am consulting?

The ownership of inventions made while consulting for an outside company depends on the terms of your employment contract with the institution and your consulting contract. You should consult with your institution's IP or technology transfer specialists before agreeing to consult with regard to an invention of which you were an inventor. When researchers at academic institutions enter into consulting agreements, they are typically deemed to be acting outside of the scope of their employment. Therefore, consulting arrangements are usually neither negotiated by the institution nor formally reviewed by the institution. You should familiarize yourself with your institution's policies relevant to consulting activities and ensure that the terms of the consulting arrangement are consistent with those policies, including those related to IP ownership, employment responsibilities, and IP use. You will normally not be allowed to enter into consulting agreement terms that conflict with your institution's policy on IP ownership with regard to inventions created during employment with your institution. If you have questions, you should contact your institution's IP or technology transfer specialists or legal counsel to learn more.

Who owns rights to inventions made while on sabbatical?

Generally, if you are on a sabbatical paid by an academic institution, the institution retains rights to any discoveries connected to your scope of employment. Contact your institution's IP or technology transfer specialists before your sabbatical to ensure that ownership considerations are documented.

Should I list visiting scientists or scientists at other institutions on my Technology Disclosure?

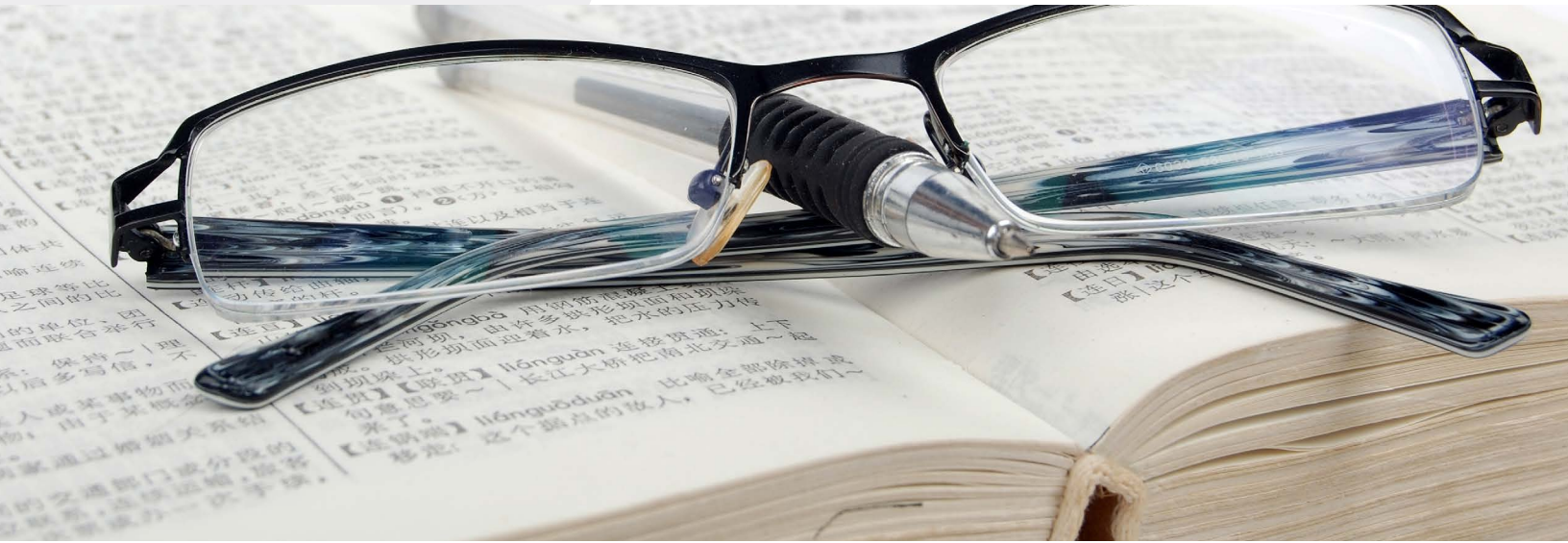
All persons that may have contributed to the ideas leading to an invention should be mentioned in your Technology Disclosure/Invention Disclosure, even if they are not your institution's employees. Your institution's IP or technology transfer specialists (along with the Lead Institutions, if the circumstances require) will assist in determining the rights of such persons and institutions. It is prudent to discuss with your institution's IP or technology transfer specialists all working relationships (preferably before they begin) to understand the implications for any subsequent inventions. In circumstances in which a scientist is visiting from another country, you should consult with your institution's IP or technology transfer specialists before the visiting scientist begins work.

Can a student contribute to an invention?

Yes, many students work on inventions at academic institutions under a wide variety of circumstances. Institutional policy usually allows students to be named as inventors. Typically, a student working on a CERC project will be treated in ways similar to an institution's regular employee.



Intellectual Property Basics



Patents

What is a patent?

Generally, a patent gives the holder the right to exclude others from practicing the patent invention. A patent claim is the scope of legal protection sought under a patent application, and if a patent is granted, the patent defines the boundary of protection afforded the invention under law.

A very common misperception is that anyone who owns a patent can practice the patent. A patent actually gives a limited monopoly, meaning a right of exclusion, over the invention, not a right to use the invention. It is very important to keep this in mind in understanding patent licensing issues. The right to use an invention may implicate rights to prior art (i.e., anything that has been made or publicly disclosed in the past) or an invention very similar to your patented invention, giving rise to a risk of infringement. Prudence may require appropriate licensing from those other owners in order to practice a patent.

Patentable subject matter includes processes, machines, composition of matter, computer programs, and even methods for doing certain things. Generally, a naturally occurring substance is not patentable, unless the substance has never before been isolated or known.

Many countries have official departments to administer patents. The relevant U.S. organization is the U.S. Patent and Trademark Office, and the Chinese organization is the State Intellectual Property Office.

Patent rights are territorial in nature. This means that an invention patented in the United States may not have protection in China unless the same invention is filed and granted a patent in China. The reverse is also true. It may, therefore, be desirable to file for patents in multiple countries (not just the United States or China). There is no such thing as an "international patent," but there are international treaties/conventions to facilitate patent applications across different countries. See the Q&A: "Is there such a thing as an international patent?"

Almost all countries (including China) and regions now adopt the first-to-file system. The United States has recently adopted a first-inventor-to-file system (which is a change from the former first-to-invent system). If you have an invention suitable for patent protection and intend to file for a patent, you should always opt to file sooner rather than later.

Ultimately, where to file is a matter of patenting strategy, and that often relates to commercial considerations. Also, it deserves emphasis that early disclosure of an invention may affect its patentability. Any disclosure of your invention before patenting, including in academic journals, or demonstration of a related prototype in a trade show, may undermine your ability to obtain a patent for the invention. CERC researchers should always exercise caution to preserve the patentability of their inventions. See the Q&A: “Will I be able to publish the results of my research and still protect the commercial value of my IP?”

If you are considering patenting in China and the United States, there are points to consider as to where you should file first. See the Q&A: “How does patent protection in the United States differ from that in China?”

areas. Inventors work with the patent counsel in drafting the patent applications and responses to patent offices during the patent prosecution process.

What is the patenting process?

Patent applications are generally drafted by a patent attorney or a patent agent who has requisite qualifications. The patent attorney or agent will ask you questions to better understand your invention and will request that you review the application before it is filed.

At the time an application is filed, the patent attorney or agent will ask the inventor(s) to sign an Inventor’s Declaration (or a similar instrument) and, typically, an Assignment to assign the patent rights to your institution. (This applies to the application process in the United States. In China, the institutions that own the patent rights will apply under the institution directly.) See the Q&A: “Who owns what I create?” on page 16.

The patenting process is generally similar across jurisdictions. The following describes the typical U.S. patenting process and is indicative of the process in China and elsewhere.

In 12–24 months or longer, depending on the technology, the patent attorney or agent will receive written notice from the official patent-granting authority as to whether the application and its claims have been accepted in the form as filed. More often than not, the official patent-granting authority will reject the application because either certain formalities need to be addressed or the claims are not patentable over the prior art (i.e., anything that has been made or publicly disclosed in the past). The authority may instead request an amendment to the application.

If the application is rejected or there is a request to amend, the patent attorney or agent must file a written response within the time allowed (usually several months). Generally, the patent attorney or agent may amend the claims and/or point out why the official patent-granting authority’s position is incorrect. This procedure is referred to as patent prosecution.

Often, it will take two rounds, sometimes more, of official patent-granting authority action and patent attorney responses before the application is resolved and the patent sought is issued. During the back and forth of action and response, input from the inventor(s) is

What is the definition of an inventor, and who determines this?

Generally, an inventor is a person who conceives of an essential element of the invention as described in the patent claim of a patent application. A patent claim is the scope of legal protection sought under a patent application, and the specifics of a claim may change during the prosecution of the patent application to make an invention more patentable. An employer or person who furnishes money to build or practice an invention is not generally an inventor. A person who contributed only labor and/or the supervision of routine techniques or who does all the experiments with direction from another person, but who did not contribute to the conception of one of the embodiments of the claimed invention, is not considered an inventor. In sum, inventorship is a legal issue and may require an intricate legal determination by legal counsel.

Who is responsible for patenting?

Your institution’s IP or technology transfer specialists will be primarily responsible for leading the patenting process, although they may work with other institutions and industry partners who may have been involved or otherwise contributed to the invention. The specialists may contract with outside patent counsel for IP protection, thus ensuring access to patent specialists in diverse technology

often needed to confirm the patent attorney's understanding of the technical aspects of the invention and/or the prior art cited against the application. The official patent-granting authority keeps patent applications confidential until they are published.

Is there such a thing as a provisional patent?

Not in China. However, there is a provisional patent application in the United States, and there is a procedure in China for an applicant to claim "domestic priority."

What is the difference between a provisional patent application and a regular patent application in the United States?

In certain circumstances, U.S. provisional patent applications can provide a tool for preserving patent rights while temporarily reducing costs and perhaps providing extra time to prepare a regular application. The advantage of a provisional patent application is that no claims are required (because the application is not examined), but upon filing, the date of priority is established. A regular U.S. application and related foreign applications must be filed within one year of the provisional filing in order to receive the benefit of the provisional application's early filing date. However, since an applicant receives the benefit of the earlier filing date only for

material that is adequately described and enabled in the provisional application, it is still important to work with your institution's IP or technology transfer specialists and/or patent attorney when preparing a provisional patent application.

How does patent protection in the United States differ from that in China?

Patent protection in each country is subject to that country's laws and procedures. The United States offers a one-year grace period after publication; a patent may be filed during that year. In many other countries, including China, an inventor may well lose patent rights if he or she has disclosed the invention publicly prior to filing the first application in one country (or prior to the priority date). Thus, it is important to file in China before attempting to file in the United States (or elsewhere) to preserve the patentability in China.

Also, it deserves emphasis that early disclosure of an invention may affect its patentability. CERC researchers should always exercise caution to preserve the patentability of their inventions. See the Q&A under the Technology Disclosure section of this document.

The following table describes some of the major features of patent protection in the United States and in China:

Key IP Terms and Processes

United States	China
Prior art includes circumstances in which: - There was public disclosure (e.g., publication, public knowledge or use, etc.) before the effective filing date of the claimed invention. - Another patent/patent publication was effectively filed before the effective filing date of the claimed invention.	Prior art includes circumstances in which: - There was a relevant publication before the patent application date, or before the priority date. - The invention was known to the public anywhere in the world before the patent application date, or before the priority date.
One-year grace period (before the effective filing date of a claimed invention) for self- or derivative disclosure	No grace period of disclosure except for non-prejudicial disclosure under the Patent Law
Continuation or continuation-in-part available	No continuation or continuation-in-part
Joint ownership: By default, each joint inventor may license the patent without approval of the other inventors and without paying them a share of any royalties received from the licensee, unless otherwise agreed.	Joint ownership: By default, each patentee can grant non-exclusive license without consent of other patentee(s) but shall pay them a share of any royalties received from the licensee, unless otherwise agreed.
Governmental rights: Compulsory licenses are granted only to the U.S. government.	Governmental rights: Anyone can apply for a compulsory license.
A utility patent is the same as an invention patent. There are no "utility model" patents.	A utility model patent is available in addition to an invention patent and a design patent.
Patent term adjustment is available if the U.S. Patent and Trademark Office causes a prosecution delay.	There is no patent term adjustment.
Single-track litigation: Infringement and invalidation are typically litigated together.	Two-track litigation: Infringement and invalidation are separate.
Company or inventor can be applicant	Company or inventor can be applicant
First inventor to file	First to file
Fewer categories of non-patentable subject matter	More categories of non-patentable subject matter
Invalidation at U.S. Patent and Trademark Office or court, appeal to the federal circuit courts	Invalidation at State Intellectual Property Office, appeal to courts

Is there such a thing as an international patent?

Although an international patent does not exist, an international agreement known as the Patent Cooperation Treaty (PCT) provides a streamlined filing procedure for most industrialized nations, including China and the United States. For example, a Chinese or a U.S. inventor can file a regular or provisional patent application and, within one year, file a PCT application.

What is gained by filing an application under the PCT?

The PCT application provides two advantages. First, it delays the need to file costly foreign applications until a much later time (for some foreign countries, up to 31 months after the U.S. filing date or 30 months after the filing date in China). This allows the inventor further time to develop, evaluate, and/or market the invention for licensing to potential commercial partners, and to decide whether to continue the application.

Second, the international preliminary examination often allows an applicant to streamline the patent prosecution process by first having a single examiner speak to the patentability of the claims. This affords the opportunity for preliminary examination and patent searches to assess the prospects of having patents granted in various countries, which could help save significant costs in prosecuting foreign patent applications later on.

What does the Paris Convention do?

Another important international treaty called the Paris Convention permits a patent application filed in a second country (or a PCT application) to claim the benefit of the filing date of an application filed in a first country, provided that a so-called “convention application” is filed in a foreign country (or as a PCT application) within one year (in China, the priority period for design patent or for trademark applications is six months) of the first filing date of the application in the first country.

What is the timeline of the patenting process and resulting protection?

Currently, the average U.S. patent application is pending for about 3 years, though inventors in the biotech and computer fields should plan on a longer waiting period. Once a U.S. patent is issued, it is enforceable for 20 years from the initial filing of the application that resulted in the patent. There is, however, a patent maintenance fee payable during the term of the patent.

Currently, the average China patent application is pending for about 1–2 years. Once a China invention patent is issued, it is enforceable for 20 years from the initial filing date of the application that resulted in the patent. Utility model patents and design patents are enforceable for 10 years.

What are utility model patents?

China offers a special type of patent, a utility model patent, that does not exist in the United States. Utility model patents are meant to provide a faster patenting process track for some types of inventions, especially for technical features that relate to structures or shapes. The term of protection is 10 years.

Utility model patents are not subject to substantive examination, although in recent years the State Intellectual Property Office (China’s national patent-granting authority) has tightened the examination standard. Applicants are permitted to apply concurrently for a utility model patent and an invention patent covering the same invention. If the invention patent is granted, the applicant will then be permitted to abandon the utility model patent application.

Applying for utility model patent protection might give an applicant a shorter timeline needed for enforcement or for licensing purposes. You should consult your institution’s IP or technology transfer specialists to see if this is a suitable approach for your invention.

Why does an academic institution want to protect some IP through patenting?

Often a sizable investment is required to bring a technology to market, and this investment is often provided by a commercial partner. Commercial partners (licensees) often require patent protection to protect the investment required to bring the technology to the market.

As the patent process is expensive and time-consuming, your institution may not have the resources to file patents for all inventions. Your institution will have a policy to review and discuss with the inventors the commercial potential for an invention before investing in the patent process.

What if I created the invention with someone from another institution or company?

Generally, the invention will be jointly owned, but agreements between you, your institution, and the other institution(s)/company(ies) involved may say differently. You should refer to your institution's policies on invention ownership and the relevant agreements.

Will my institution initiate or continue patenting activity without an identified licensee?

Often the institution accepts the risk of filing a patent application before a licensee has been identified. After a licensee is found, the licensee generally pays the patenting expenses. At times, an institution must decline further patent prosecution after a reasonable period (often a year or two) of attempting to identify a licensee.

Copyrights

What is copyright, and how is it useful?

Generally, copyright is a form of protection provided under law to the authors of "original works of authorship." It generally gives the owner of the copyright the exclusive right to conduct and authorize various acts, including reproduction, public performance, and creation of derivative works. Typically, copyright protection is available to both published and unpublished works and is secured when a work is fixed in a tangible medium such as a book, software code, or video. China law, in particular, will afford copyright protection to oral works; it is not mandatory to fix the work in a tangible medium.

A "derivative work" is a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted. A work consisting of editorial

revisions, annotations, elaborations, or other modifications that, as a whole, represent an original work of authorship is a "derivative work." The owner of a copyright generally has the exclusive right to create derivative works.

In the Internet age, the exclusive right to reproduction is increasingly subject to inroads resulting from the transmission and use of copyrighted works over the World Wide Web. The legal issues are evolving, and you should consult your institution's IP or technology transfer specialists about how to safeguard work that could be posted online.

In the United States, there is a "fair use" doctrine that works as an exception to copyright protection. The fair use doctrine permits the limited use of copyrighted work without the permission of the copyright owner. Examples of fair use include the reproduction of a particular work for the purposes of criticism, comment, news reporting, teaching, scholarship, research, etc. The doctrine of fair use has no fixed one-size-fits-all definition. Rather, what is a fair use is determined with reference to the circumstances. The distinction between a fair use and an infringement cannot always be easily defined. Your institution will likely have guidelines for fair use of copyrighted works, but even so, there may be occasions on which it will be advisable to obtain express permission from the copyright holder before using copyrighted material.

Though the general concept of copyright protection is the same in China as in the United States, there are some considerable differences. China law does not officially recognize the fair use doctrine, but people often rely on an enumerated list of exceptions and limitations to copyright protection under the PRC Copyright Law to achieve similar effect. The activities within the enumerated list are deemed to be legal, and whether the activities outside such an enumerated list will actually be permitted is still subject to legal review on case-by-case basis.

Also different from U.S. practice, and similar to practices of other civil law countries, is China's adoption of a copyright collective management system in which industry associations or entities are established to exercise copyrights on different art works as collective copyright owners.

The current copyright law of China was implemented in 2010 and is currently in the process of its third comprehensive amendment.

You should consult your institution's IP or technology transfer specialists or legal counsel whenever you have an issue that may involve copyright issues.

Should I register copyright? How do I present a copyright notice?

Although copyrightable works do not require a copyright notice, it is advisable to have one. In the United States and China, the remedies for infringement are greater for works that are registered with the authority (e.g., the U.S. Copyright Office or the Copyright Protection Center of China). You may want to consult your institution's IP or technology transfer specialists or legal counsel as to the appropriate copyright notice for your work and for advice as to whether you should register your work.

It is recommended that you present a copyright notice in your work of authorship. For works owned by your institution, you can use a form of notice as follows:

© 20xx [Institution Name].
All rights reserved.

If I have developed or used "software algorithms" and "analytical methods" in connection with CERC research, can they be protected?

In the United States, software embodying "software algorithms" or "analytical methods" can be protected by copyright if it is an original work, or as trade secret, subject to applicable laws. Patent protection has been utilized for software algorithms or analytical methods, but case law has evolved such that patent eligibility is uncertain, so be sure to consult with your Institution's IP or technology transfer specialist for further guidance.

In China, software embodying "software algorithms" or "analytical methods" can be protected by copyright if it is an original work, or as trade secret. It would also be possible to seek patent protection on software algorithms or analytical methods, but such an application in China would (probably) have to meet even more stringent criteria during patent examination than would be the case for a U.S. patent application. For an application to be successful in China, it must demonstrate that such software algorithm or analytical method

has the technical effect of resolving certain technical issues or problems in respect of the implementation of a certain solution or way of doing things. Algorithm or methods that are purely a representation or reflection of the mental process or human intellect in a certain solution or way of doing things will not be patentable in China. To attempt patent protection of software algorithms or analytical methods to the fullest extent possible in China be sure to consult with your institution's IP or technology transfer specialists before proceeding.

You will probably need expert help on these matters, and you should consult your institution's IP or technology transfer specialists on these matters in order that they and/or outside patent counsel can give you the assistance needed.

Trademarks

What is a trademark or service mark, and how is it useful?

A trademark includes any word, name, symbol, device, or combination thereof that is used in commerce to identify and distinguish the goods of one manufacturer or seller from those manufactured or sold by others, thus indicating the source of the goods. In short, a trademark is a brand name.

A service mark is any word, name, symbol, device, or combination thereof that is used, or intended to be used, in commerce to identify and distinguish the services of one provider from those of others, thus indicating the source of services.

The right to a trademark is to exclude others from using an identical or similar mark on identical or similar goods or services. The nature of the right is practically the same in the United States as in China, but there are some considerable differences in how to claim rights to a mark in the United States versus China.

What is trademark registration?

Trademark registration is a procedure in which the official trademark registration authority provides a determination of rights. In the United States, the U.S. Patent and Trademark Office handles trademarks. In China, the authority is the China Trademark Office.

A registered mark is often indicated with (r). Marks not registered are indicated with (tm).

Are there any differences between trademark protection in the United States and in China that I should bear in mind?

Yes, there are some significant differences.

Trademark protection in the United States can be claimed through earlier use of the mark (an earlier-to-use system), but in China, the protection is based on the filing date under the first-to-file system. Thus, it is important to file early in China (and other such countries) to avoid the issue of “squatters.” Trademark owners who failed to file first in China have often had to spend considerable sums to buy back the right from trademark squatters, entities that acquire a trademark for the sole purpose of selling the mark to the legitimate mark owner in other jurisdictions.

In countries such as China where a non-Roman script is used, it is wise to register a mark composed of words or a word-design combination in English, in a transliterated form in the local language script, and in Romanized transliterations (pinyin).

China recently amended its trademark law. You should consult your institution’s IP or technology transfer specialists or legal counsel if you have questions.

Trade Secrets

What is a trade secret?

A trade secret is information that derives independent economic value, actual or potential, from not being generally known to other persons (i.e., being secret). Essentially, it is some protection afforded by law to information that has some economic value and is subject to measures reasonably taken to maintain its secrecy. In that sense, a trade secret differs from a patent in that a patent is public disclosure of an invention in exchange for a limited monopoly over that invention, whereas trade secret protection is achieved by way of keeping such information confidential. Accordingly, an inventor must choose between patent and trade secret protection for an invention; he or she cannot have both. If it is to be a patent, it will not be a trade secret, and vice versa. But for some technologies that encompass multiple invention elements, you may choose to protect some parts as patents and some parts as trade secrets.

Typical examples of trade secrets include formulae, engineering design papers, confidential client lists, and special techniques for industrial processes. In China, a trade secret is often referred to as a “technical secret,” but the actual scope of trade secrets is broader than just technical information.

In technology transfer, an invention kept as a trade secret can have as significant a value, whether scientific or commercial, as patented or patentable technologies.

How are trade secrets related to CERC research?

Even though you may be engaging in academic research at an academic institution, you will have occasion to handle, and to safeguard, trade secrets. Trade secrets may well come into a CERC research project in the form of Background IP (i.e., IP already created outside of CERC). Your institution may be subject to contractual requirements to keep certain information relating to such Background IP confidential. You are likely already subject to confidentiality obligations under your employment agreement with your academic institution. You may also be subject to specific confidentiality or non-disclosure agreements (NDAs) with regard to such Background IP.

How can I safeguard a trade secret?

Your institution will normally require employees such as yourself to contractually agree to keep certain information confidential, whether as part of the employment agreement or via a separate confidentiality agreement. Should you leave your institution for a new job or for other reasons, your institution will also likely require that you sign a non-disclosure and/or non-competition agreement that will include confidentiality obligations and covenants not to exploit the confidential information against the interest of the owners of such information. In China, an enforceable non-competition agreement often requires reasonable amounts (relative to the employee’s remuneration) of financial considerations to be paid.

Further to contractual agreements, it is necessary to demonstrate efforts being made and measures being taken to protect confidential information. What measures would be necessary may well depend on industrial practice with respect to the type of information at issue.

Accordingly, it is important to keep in mind the need to identify trade secret/confidential information and to mark it as such. It is also important to identify and mark equipment or facilities that may hold or store confidential information/trade secrets and to limit access to such equipment or facilities by way of a sign-in/sign-out procedure or password/encryption protection.

Trade secrets are most commonly lost through emails and USB drives. It may be advisable to forbid the use of USB drives. It is always good practice to doublecheck the addressees of emails vis-à-vis the content of the email and attachments. When an employee leaves, it may be advisable not to immediately reassign computer or other equipment so that there is a way to prove a chain of custody of such hardware.

What about trade secret protection in China?

The concept of trade secret protection in China has been largely consistent with U.S. and international practice. China offers civil,

administrative, and criminal remedies for the loss of trade secrets and is engaging in frequent exchanges and negotiations with the United States and the international community on further enhancing trade secret protection.

Trade secret protection cases are often settled in China's civil courts. Chinese courts can and have issued injunctions against infringers and awarded damages to plaintiffs based on the losses suffered.

However, criminal liability may be the most notable feature of China's trade secret protection. In China, trade secret thefts that amount to "provable" demonstrable losses in excess of RMB 500,000 (approximately USD 80,000) will trigger criminal investigations. In recent times, ex-employees and trade secret violators were the subjects of criminal prosecution almost every year.

On a practical note, preserving a paper trail or otherwise proving you have taken the steps to protect confidential information may be of increased importance.





Marketing an Invention



How does CERC market my inventions?

There are already industry partners in CERC that may be well-suited to further develop your invention, and the Lead Institutions may be able to assist you in identifying the right industry partners.

However, you are not prevented from looking for other potential licensees. Your institution's IP or technology transfer specialists may also have the resources and strategies in place to identify potential licensees and market inventions. Sometimes the inventors, the technology transfer specialists, and other researchers may have existing relationships that are useful in marketing an invention. The institution's IP or technology transfer specialists may attempt to cultivate existing licensing relationships or to develop new relationships through contacts obtained from website posting inquiries, market research, and industry events.

How long does it take to find a potential licensee?

To the extent that CERC industry partners are already involved in CERC research projects, they may be more ready to come to a decision and take on the invention for further development. Recently, patent licensing and executing companies, or PLECs, have also been active in the U.S. licensing arena. More generally speaking, it can take months and sometimes years to locate a potential

licensee, depending on the attractiveness of the invention, its stage of development, competing technologies, and the size and intensity of the market. Most university inventions tend to be in the early stages of the development cycle and thus require substantial commercialization investment, making it difficult to attract a licensee.

How can I assist in marketing my invention?

Your active involvement can dramatically improve the chances of matching an invention to a CERC industry partner or an outside company. Your research and consulting relationships are often helpful in identifying both potential licensees and technology champions among industry partners or outside companies. Once interested companies are identified, the inventor is the best person to describe the details of the invention and its technical advantages. The most successful technology transfer results are obtained when the inventor and the licensing professional work together as a team to market and sell the technology.

Can there be more than one licensee?

Yes, an invention can be licensed to multiple licensees, either non-exclusively to several companies or exclusively to several companies, each for a unique field of use (application) or geography.



Deciding to Establish a Start-up Company



Under CERC, can research be developed into a business?

You may have an interest in developing your research into a business and the ability to do so. CERC does not have any role in this, but you should discuss the possibility with your institution's IP or technology transfer specialists. It is possible that your research can be further developed through one of the CERC industry partners. It may also be possible for the research to be further developed through licensees who are not existing industry partners or through newly formed start-up companies. A common practice for bringing U.S. technologies into China is to form a joint venture with a Chinese business in accordance with China's foreign investment laws. Chinese technology companies can also set up businesses in the United States, with or without partners from the United States.

What is a start-up company, and why would I choose to establish one?

A start-up is a new business entity formed to commercialize one or more related inventions. Forming a start-up company is an alternative to licensing the IP to an established business. A few key factors when considering a start-up company are:

- development risk (often companies in established industries are unwilling to take the risk)

- potential for multiple products or services from the same technology (few companies survive on one product alone)
- sufficiently large competitive advantage and target market
- potential revenues sufficient to sustain and grow a company

Under CERC, who decides whether to form a start-up?

If a new business start-up is chosen as the preferred commercialization path, your institution will assist in planning and executing the process. CERC has no role in this.

Under CERC, where does a new company have to be incorporated?

Again, CERC has no role in this. A new company may be incorporated in the United States or in China. In the United States, incorporation is a matter for the individual states rather than the federal government. The practical implication is to decide on the state of incorporation, but the company need not base its operations in that state. It is entirely possible for the company to be incorporated in one state but to carry on its business in another state or in more than one state.

If the company is to be incorporated in China, some consideration should still be given to choosing the locale. Even though China is a unitary state and incorporation procedures are

quite similar across the country, some localities are able to offer better tax or other incentives to attract investments, especially foreign investments with capital or technology from outside China. Some localities are particularly keen on encouraging the development of specific industrial sectors. The free trade zones (e.g., Shanghai, Tianjin, the Guangdong Province, and other regions) that are now being established across the country may be attractive options when deciding where to incorporate and where to locate a business.

Where U.S. shareholding and/or technology as capital contribution is anticipated, a new company in China will have to be formed in such a way that satisfies prevailing foreign investment laws of China and the regulations applicable to the locality. In some instances, a foreign investor may not be permitted to own a majority or controlling interest in a Chinese entity.

There have been circumstances in which foreign investor(s) in a new company in the United States are not permitted to own a majority or controlling interest.

What role does an inventor usually play in a company?

In an academic institution, faculty typically serve as technology consultants, as advisors, or in some other technical developmental capacity. Rarely will faculty choose to leave the institution and join the start-up. In many cases, the faculty member's role is suggested by the start-up investors and management team, who identify the best role based on the inventor's expertise and interests. As the company matures and additional investment is required, the inventor's role may change. Faculty involvement of any kind in a start-up is also reviewed by your institution for conflicts of interest. Student inventors and post-doctorates may choose to join the start-up upon graduation but rarely have the experience or business skills to serve as the company's sole management. See the Q&A in the Navigating Conflicts of Interest section of this document.

Creating a start-up in China presents the same questions as doing so in the United States. In China, as in the United States, an angel or venture capital investor is often the first to fund an entrepreneur taking the first steps in building a business. Whether in China or in the United States, when starting a business, caution is warranted in selecting your business partners.

How much of my time and effort will it take?

Starting a company requires a considerable amount of time and effort. Until the start-up team is identified and engaged, the faculty member will need to champion the formation effort. After the team is in place, effort is required for investor discussions, formal responsibilities in or with the company, and institution processes such as conflict of interest reviews. See the Q&A in the Navigating Conflicts of Interest section of this document.

Can my academic institution accept equity in the company?

Your institution may have policies with regard to acquiring equity in a company. In many cases, academic institutions can accept equity as part of the financial terms of the license. Equity may be an alternative to cash considerations, which can be often be a difficult ask for start-ups. Equity also allows the institution to share some of the risk associated with the start-up. A decision to accept equity must make sense for both the institution and the company.

Will CERC pay for incorporating a start-up company?

No, CERC has no role in forming a start-up. As a separate entity, the start-up must pay for its own legal matters, including all business incorporation matters and licensing expenses.

What legal assistance is needed in creating a start-up?

In addition to initial assistance from outside counsel, a start-up may hire corporate counsel and have its own IP counsel to assist with corporate patent strategy, especially if the company will be involved in a patent-rich area. Also, it is wise for inventors to have agreements regarding their roles with the start-up reviewed by their own counsel to ensure that all personal ramifications—including taxation and liabilities—are clearly understood.

License Agreements



What is a license?

A license is a permission that the owner or controller of IP grants to another party, usually under a license agreement. An IP license is a contract to permit where, when, and how your IP can be used by another party, whether for free, for royalties, or in exchange for other services.

What is a license agreement?

License agreements describe the rights and responsibilities related to the use and exploitation of IP. Such agreements usually stipulate that the licensee should diligently seek to bring the IP into commercial use and provide a reasonable return to the owner of the underlying IP. Your institution may already have certain policies in place with regard to licensing IP it owns.

How is a company chosen to be a licensee?

Typically, a licensee is chosen based on its ability to commercialize the technology. Sometimes an established company with experience in similar technologies and markets is the best choice. In other cases, the focus and intensity of a start-up company is a better option. It is rare to have multiple potential licensees bidding on an invention resulting from university research. Your institution may already have certain policies in place with regard to licensing IP it owns.

What can I expect to gain if my IP is licensed?

Your institution may already have certain policies in place with regard to financial return from a license. It may be that a share of any such financial return is provided to the inventor(s).

Most inventors enjoy the satisfaction of knowing their inventions are being deployed for the benefit of the general public. New and enhanced relationships with businesses are another outcome that can augment one's teaching, research, and consulting. In some cases, additional sponsored research may result from the license.

What is the relationship between an inventor and a licensee, and how much of my time will it require?

Many licensees require the inventor's active assistance to facilitate their commercialization efforts, at least in the early stages of development. This assistance can range from infrequent informal contacts to a more formal consulting relationship. Working with a new business start-up can require substantially more time, depending on your role in or with the company and your continuing role within your institution. Your participation with a start-up is governed by your institution's conflict of interest policies and the approval of your supervisor.

What other types of agreements and considerations apply to technology transfer?

Non-Disclosure Agreements (NDAs) are often used to protect the confidentiality of an invention during evaluation by potential licensees. NDAs also protect proprietary information of third parties that you as researcher may need to review in order to conduct research or to evaluate research opportunities. Your institution will likewise enter into NDAs to protect your institution's proprietary information that is being shared with some outside party.

Material Transfer Agreements (MTAs) are for incoming and outgoing materials for research activities at your institution. These agreements describe the terms under which researchers may share materials with outside researchers, typically for research or evaluation purposes. IP rights can be endangered if materials are used without a proper MTA.

Inter-Institutional Agreements describe the terms under which two or more institutions (e.g., two universities) will collaborate to assess, protect, market, license, and share in the revenues received from licensing jointly owned IP.

Option Agreements, or Option Clauses within research agreements, describe the conditions under which your institution preserves the opportunity for a third party to negotiate a license for IP. Option Clauses are often provided in a Sponsored Research Agreement with corporate sponsors; Option Agreements are entered into with third parties wishing to evaluate the technology prior to entering into a full license agreement.

Research Agreements describe the terms under which sponsors provide research support to the institution.



Commercialization



What activities occur during commercialization?

Most licensees continue to develop an invention to enhance the technology, reduce risk, prove reliability, and satisfy the market requirements for adoption by customers. This can involve additional testing; prototyping for manufacturability, durability, and integrity; and further development to improve performance and other characteristics. Documentation for training, installation, and marketing is often created during this phase. Benchmarking tests are often required to demonstrate the product/service advantages and to position the product in the market.

What is my role during commercialization?

Your role can vary depending on your interest and involvement, the interest of the licensee in utilizing your services for various assignments, and any contractual obligations related to the license or any personal agreements.

What revenues might be generated for my institution if commercialization is successful? If unsuccessful?

Most licenses have licensing fees that can be very modest (for start-ups or situations in which the value of the license is deemed to warrant a modest license fee) or can reach hundreds of thousands of dollars. Royalties on the eventual sales of the licensed products can generate revenues, although this could require a wait of a number of years. If included in a license, equity can yield returns, but only if a successful equity liquidation event (public equity offering or a sale of the company) occurs. Most licenses do not yield substantial revenues.

A recent study of licenses at U.S. universities demonstrated that only 1% of all licenses yield over \$1 million. However, the rewards of an invention reaching the market are often more significant than the financial considerations alone.

What will happen to my invention if the start-up company or licensee is unsuccessful in commercializing the technology? Can the invention be licensed to another entity?

Licenses typically include performance milestones that, if unmet, can result in termination of the license. This termination allows for subsequent licensing to another business.

Navigating Conflicts of Interest



When should I seek guidance on conflicts of interest?

Your institution probably already has policies and procedures on conflict of interest matters. It is your responsibility to comply with those policies and procedures. Whenever a question or uncertainty arises, you should seek guidance. Your institution's IP or technology transfer specialists can advise you about conflict of interest issues or direct you to the appropriate department or person.



