

The SingHealth Guide for Inventors

SingHealth Intellectual Property Office



THE SINGHEALTH GUIDE FOR INVENTORS

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SingHealth Intellectual Property (SHIP) is the technology transfer office serving SingHealth. We work with our clinicians and researchers to move their inventions towards commercial opportunities in order to improve the lives of patients and deliver better healthcare.

We aim to make it easy for you to be involved in the research innovation process. It is never too early to get in touch as we can engage with you at any stage of your project's development. You can meet with us to discuss your idea in confidence and we can guide you on the next steps.

NOTE: This booklet was developed in March 2018 and is based on the University of Michigan's "Inventor's Guide to Technology Transfer", with adaptations for SingHealth. We are very grateful to UM Tech Transfer for their permission to use these materials.



Technology transfer

What is technology transfer?

Technology transfer is a broad term that describes the transfer of knowledge and discoveries to the general public. It can occur through publications, educated students entering the workforce, exchanges at conferences, and relationships with industry, among other things.

What is the SingHealth Intellectual Property (SHIP) Office?

SHIP is an office composed of specialists in patenting, licensing, business development, and commercial matters who are experienced in transferring technologies from the healthcare and life sciences. We are responsible for managing, protecting and commercialising inventions from all the institutions under SingHealth.

How do I work with SHIP?

We encourage you to contact SHIP during your early research activities to be aware of the options that will best leverage the commercial potential of your research. SHIP can assist you with your questions related to patenting and other protection methods, marketability, funding sources, commercial partners and new business start-up considerations, SingHealth policies and procedures, and much more.

How is technology transferred?

Technology is typically transferred through a licence agreement in which SingHealth grants its rights in the defined technology to a third party for a period of years, often limited to a particular field of use and/or region of the world. The licensee (the third party licensing the technology) may be an established company or a new business start-up. Licences include terms that require the licensee to meet certain performance requirements and to make financial payments to SingHealth. These payments are shared with the inventors, their institution and SingHealth to incentivise the inventors and provide support for further research, education, and participation 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.

Why would I want to participate in technology transfer?

The reasons are unique to each person but may include:

- Making a positive impact on healthcare
- Feeling a sense of personal fulfilment
- Achieving recognition and financial rewards (personal, institutional)
- Meeting the obligations of a research contract
- Attracting research funding
- Creating educational and career opportunities for students

How can I help in this process?

Contact SHIP when you believe you have created or discovered something unique with potential commercial value. Complete and submit the [SingHealth Invention Disclosure Form](#) before publicly disclosing your technology or submitting a manuscript for review and publication. Please make sure to list any funding that was used in support of the invention (government, charity or industry) as well as any materials received from third parties used in the development of the invention.

Assist SHIP identify commercial partners. On the [SingHealth Invention Disclosure Form](#), include companies and contacts you believe might be interested in your invention or who may have already contacted you about your research. Studies have shown that over 70% of all academic licensing is executed with commercial entities known by the inventor, so your contacts can be extremely useful. To avoid risking your patent rights and possibly hindering the opportunity to market your invention, contact SHIP before holding any discussions with people or companies outside the SingHealth community.

Respond to SHIP and outside patent counsel requests. While some aspects of the patent and licensing process may require significant participation on your part, we will strive to make efficient use of your valuable time. Keep SHIP informed of upcoming publications or interactions with companies related to your intellectual property.

What are the typical steps in the process?



1. Research

Observations and experiments during research activities often lead to inventions. An invention is any useful process, machine, composition of matter (e.g. chemical or biological compounds), or any new or useful improvement of the same. Inventions also may include software, website content and other educational or research content. Often, multiple researchers may have contributed to the invention.

2. Invention Disclosure Form

An [Invention Disclosure Form](#) remains a confidential document and should fully document your invention so that the options for patenting and commercialisation can be evaluated and pursued.

3. Assessment

The period in which you and your SHIP case manager review the Invention Disclosure Form, conduct prior art searches (if applicable) to assess patentability and analyse the market and competitive technologies to determine the invention's commercial potential. This evaluation process, which may lead to a broadening or refinement of the invention, will guide our strategy for protection and marketing to potential licensees.

4. Intellectual Property Protection

The process in which protection for an invention is pursued. Patent protection, a common legal protection method, begins with the filing of a patent application with the Singapore Patent Office and/or, when appropriate, foreign patent offices. Once a patent application has been filed, it typically will require several years and tens of thousands of dollars to obtain issued Singaporean and foreign patents (and there is no guarantee of success). Other protection methods include

copyright, trademark, trade secrets, and contractual use restrictions (e.g., for databases and materials). Proprietary materials and software can often be licensed without any protection.

5. Marketing

With your support, SHIP identifies candidate companies that have the expertise, resources, and business networks to bring the technology to market. This may involve partnering with an existing company or forming a start up. Your active involvement at this stage can dramatically shorten this marketing process.

6. Selecting a licensee

If an appropriate and interested existing company is selected as a potential licensee, SHIP works with this company to develop the appropriate financial and diligence terms in an eventual licence agreement to fully commercialize the technology. If the creation of a new business start up has been chosen as the optimal commercialisation path, SHIP will work with the start up to license the technology. It is very often the case that there is only one suitable licensee for a technology (or there may be none at all).

7. Licensing

A licence agreement is a contract between SingHealth and a third party in which SingHealth's rights to a technology are licensed, without relinquishing ownership, for financial and other benefits. A licence agreement is used with both an established company or a new start-up. An option agreement is sometimes used to enable a third party to exclusively evaluate the technology for a limited time (usually 6 months to a year) prior to making a decision about licensing.

8. Commercialisation

The licensee continues the advancement of the technology and makes other business investments to develop the product or service. This step may entail further development, sponsored research at SingHealth, consulting agreements with the inventors, regulatory approvals, sales and marketing support, training, and other activities. The licence agreement will routinely contain development milestones that the licensee must meet to assure SingHealth that it is advancing the technology.

9. Revenue

Revenue received by SingHealth from licences are distributed to the inventors, their institutions and SingHealth to support research and education and to incentivise further participation in the innovation process. Revenue includes upfront cash payments, milestone payments and equity and it is distributed in accordance with the SingHealth Intellectual Property Policy. SingHealth will first recover patenting and commercialisation expenses and an overhead of 15%. The balance will be distributed amongst the inventor, institution and SingHealth as below:

50% to inventor* 40% to institution of inventor 10% to SingHealth

**When the invention is created by more than one inventor, this 50% shall be divided equally amongst the inventors unless SHIP receives prior written notice signed by all the inventors advising a different sharing allocation.*

When should I consider filing an Invention Disclosure Form with SHIP?

You are encouraged to contact SHIP early in the discovery process. While your invention may not be at a stage appropriate for a patent filing, our staff can advise you on a path for the future, letting you know what data/results you will need before the invention is ready for potential patent protection.

We can also start discussing possible paths toward commercialisation including a variety of funding sources for further development of your idea. As patent protection in some countries (including Singapore) is lost upon public disclosure of your technology, it is imperative that you speak with SHIP prior to publishing your research findings or sharing them with any third party by way of a public presentation (meetings, on-line abstracts, theses, dissertations, etc).

Invention disclosures

What is an Invention Disclosure Form?

An [Invention Disclosure Form](#) is a written description of your invention that you provide to SHIP. The Invention Disclosure Form should include all of the information necessary to begin the necessary due diligence, pursuing protection, marketing, and commercialisation activities. Please attach any draft manuscripts or pending grant proposals in order to simplify the process. It is especially important that you disclose any and all publications of your invention that have occurred or that you are planning. The SingHealth Invention Disclosure Form can be found [here](#).

When should I complete an Invention Disclosure Form?

An [Invention Disclosure Form](#) should be completed after you have discovered something unique with possible commercial value. This should be done well before presenting the discovery through publications, poster sessions, conferences, press releases, or other communications. If an invention is publicly disclosed (i.e., published or presented in some form) prior to the filing of a patent application, it may compromise a patent position. Be sure to inform SHIP of any imminent or prior presentation, lecture, poster, abstract, website description, research proposal, dissertation/masters thesis, publication, or other public presentation that details the invention.

How do I know if my discovery is an invention?

SHIP will perform the analysis for you. You are encouraged to submit an Invention Disclosure Form for all inventions and developments that you feel may solve a significant problem and/or have significant value. If you are in doubt, contact SHIP to discuss the invention and strategies for commercialisation. We are happy to meet at any stage of your research's development.

How does SHIP assess an invention?

When you submit your Invention Disclosure Form, SHIP undertakes due diligence to review a host of issues, including the novelty of the invention, whether it can be protected by patent or other legal protection, marketability of potential products or services, relationship to other intellectual property, size and growth potential of the relevant market, amount of time and money required for further development, pre-existing rights associated with the intellectual property, and potential competition from other products/technologies. This assessment may also include consideration of whether the intellectual property can be the basis for a new business start up. SHIP treats submitted Invention Disclosure Forms as confidential information.

Should I submit an Invention Disclosure Form on research tools?

Typically, research tools are materials such as antibodies, vectors, plasmids, cell lines, animal models and other materials used as "tools" in the research process. If your new tools would benefit other researchers and you are interested in providing them to those researchers (and/or other third parties) it is a good idea for you to report them to SHIP. SHIP will work with you to develop the appropriate protection, licensing, and distribution strategy. Most research tools do not need to be protected by patents in order to be licensed to commercial third parties and generate revenue. An additional benefit is that many

researchers have found that licensing their research tools to a commercial supplier frees them from the burden of providing them to other researchers under MTAs.

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

All contributors to the ideas leading to a discovery should be mentioned in your Invention Disclosure Form, even if they are not SingHealth employees. SHIP, along with the patent counsel if required, will determine the rights of such persons and institutions and will work with the other institution or company to find the best solution for managing the invention. If there is a sponsored research agreement with a company that relates to your invention, SHIP will need to review that agreement 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 or clinical institution, SHIP will usually enter into an Intellectual Property Agreement relating to the invention which covers, amongst other things, the sharing of expenses associated with the patenting process, and allocating any licensing revenues. If the technology is jointly owned with another company, SHIP will work with the company to determine the appropriate patenting and licensing strategy.

Should I list students, researchers at other institutions or visiting scientists on my Invention Disclosure Form?

All contributors to the ideas leading to a discovery should be listed, even if they are not SingHealth employees. SHIP will determine the rights of such persons and institutions and liaise, as appropriate.

Who owns the intellectual property I create?

Ownership depends upon the employment status of the creators of the invention and their use of SingHealth facilities and other resources.

Considerations include:

- The employment status of the inventors at the time the intellectual property was made
- The source of the funds or resources used to produce the invention
- The terms of any agreement related to the creation of the intellectual property

As a general rule, SingHealth owns inventions made by its employees while acting within the scope of their employment or using SingHealth resources, as per the SingHealth Intellectual Property Policy and the Singapore Patent Act. In some cases, the terms of a Sponsored Research Agreement or a Material Transfer Agreement may impact ownership.



Patents

What is a patent?

Although rights may vary from country to country, in general, a patent gives the holder the right to exclude others from making, using, selling, offering to sell, and importing the patented invention. Because it represents a “right to exclude,” a patent does not necessarily provide the holder any affirmative right to practice a technology; that practice may fall under a broader patent(s) owned by others.

A patent has two major components: i) the “specification” which is a technical discussion about the invention and how to practice it; and ii) the “claims” which determines the scope of protection for the said invention.

What can be patented?

Patentable subject matter includes processes, machines, compositions of matter, articles, some computer programs, and methods (including methods of making compositions, methods of making articles, and even methods of performing business). The type of inventions that are patentable vary from country to country.

Can software be patented?

Some software is patentable but in most cases patenting is not the preferred pathway for IP protection for software. This is due to a variety of factors, including the recently heightened burden in proving that a software invention is

patentable, challenges in proving infringement if a patent is obtained, and the speed at which software markets and products change. In most cases, copyright protection is sufficient to enable commercialisation of software.

What is the definition of an inventor on a patent and who determines this?

Under patent law, an inventor is a person who takes part in devising the invention as described in the patent claims of a patent application. Thus, inventorship of a patent application may change as the patent claims are changed during prosecution of the application. The important thing to remember is that inventorship is not the same thing as authorship. For example, a person who highlights a problem or furnishes money to build or practice an invention, or works on the invention without contributing an inventive concept (i.e. as a “pair of hands” only) is not an inventor.

Inventorship is a legal issue and may require an intricate legal determination by the patent counsel prosecuting the application. You should list all those individuals that might possibly be inventors and those who have contributed substantially to the invention in your Invention Disclosure Form. Once this group has been identified, the patent counsel and SHIP can determine those who are actually inventors, as defined under the Patent Act. It is important to get the inventors correct on a patent or the patent can be challenged.

The order of inventors on a patent application bears no relationship to the individual contributions of the inventors, unlike that usually seen for authors.

A detailed overview of the patent prosecution process is provided by the [Intellectual Property Office of Singapore](#).

Who is responsible for patenting at SingHealth?

Patent applications are drafted and filed by a patent attorney or a patent agent (a non-attorney with a science education licensed to practice). At SHIP, we select outside patent counsel to draft patent applications, which enables us to access to patent specialists in diverse technology areas. Inventors work with SHIP and the patent counsel in drafting the patent applications and any required responses to worldwide patent offices.

How are inventors involved in the patenting process?

The patent counsel generally will ask you to review an application before it is filed and will also ask you questions in order to determine inventorship of the application's claims. At the time an application is filed, the patent counsel or SHIP will ask the inventor(s) to sign a Declaration (which basically says that the inventor made the invention and agrees to tell the truth during patent prosecution) and an Assignment Agreement (which evidences the inventor's duty to assign the patent to SingHealth). During the patent prosecution process, input from the inventor/s is 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.

What does it cost to file for and obtain a patent?

Obtaining a patent is expensive, however the cost is covered by SHIP. Filing a regular Singapore patent application typically costs between \$2,000 and \$5,000. To obtain an issued patent may require an additional \$10,000 to \$20,000 for patent prosecution. Filing and obtaining issued patents in other countries may cost \$20,000 or more per country. Additionally, once a patent is issued in

Singapore or in foreign countries, certain government fees are required to keep the patent alive (referred to as "annuities" or "maintenance fees" in the U.S.).

How does publishing my research results affect patenting?

Publishing or presenting can prevent us from obtaining patent protection, so SHIP would like to know about your invention before you publish on it. Once publicly disclosed (published or presented in some form), an invention may have restricted or minimal potential for patent protection outside the United States. Since patent rights are affected by publishing or presenting, it is best to submit an Invention Disclosure Form or call SHIP well before communicating or disclosing your invention to people outside the SingHealth community.

Even after you submit an [Invention Disclosure Form](#), be sure to inform SHIP or any imminent or prior presentation, lecture, poster, abstract, website description, dissertation/masters thesis, publication, or other public presentation describing any part of the invention. Submitting a manuscript to SHIP at the same time you submit to a journal for presentation can be extremely helpful for both the marketing and licensing process as well as for the patent counsel assigned to the case.

Are patent applications kept secret?

For a time, yes. The Patent Office holds patent applications confidential until published by the Patent Office 18 months after initial filing. After that time, both the application and the Patent Office's prosecution materials related to the application are publicly available.

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. The best way to think about it is that while there are international patent applications, there is no such thing as an international patent. For Singapore applicants, a PCT application is generally filed one year after the corresponding Singapore application (either provisional or regular) has been submitted. The PCT application must later be filed in the national patent office of any country in which the applicant wishes to seek patent protection, generally within 30 months of the earliest claimed filing date. The PCT provides two advantages. Firstly, it delays the need to file costly foreign applications until the 30 month date, which allows the applicant to further develop, evaluate and/or market the invention for licensing. Secondly, the international preliminary examination often allows an applicant to simplify the patent prosecution process by having a single examiner speak to the patentability of the claims, which can save significant costs in prosecuting foreign patent applications. An 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. However, pursuant to this treaty, these so-called "convention applications" must be filed in foreign countries (or as a PCT) within one year of the first filing date of the Singapore application.

What is the timeline for the grant of a patent and how long does a patent last?

Currently, the average Singapore patent application is pending for about two years, before it is usually granted (but there is no guarantee of grant). Once a patent is granted, it is generally enforceable for 20 years from the initial filing of the application that resulted in the patent, assuming that the mandated maintenance fees are paid.

What is the SingHealth Patent Review Committee (SPRC)?

The SPRC was established to support SHIP by making recommendations on the prosecution of patent applications and the maintenance of granted patents in the absence of a licensee. The committee comprises stakeholders from key IP offices (A*STAR, NUS, NTU), SingHealth clinician scientists, translational funders (such as SMART, NHIC) and individuals such as patent agents and commercialisation consultants. Prior to the PCT and National Entry stages, you will be asked to present to the SPRC on the development of your technology and its commercialisation. SHIP will support you with this. The SPRC will review the patent situation, the stage of development and the prospect of commercialization and make a recommendation on whether SHIP should proceed with the patent prosecution. The final decision is made by SHIP.

Why does SHIP protect some intellectual property through patenting?

Patent protection is often a requirement of a potential commercialization partner (licensee) because it can protect the commercial partner's often sizable investment required to bring the technology to market.

Due to their expense and the length of time required to obtain a patent, patent applications are not possible or appropriate for all SingHealth intellectual property. We carefully review the commercial potential for an invention before investing in the patent process. However, because the need for instigating a patent filing usually precedes finding a licensee, we look for creative and cost-effective ways to seek early protection for as many promising inventions as possible. SHIP and the inventor/s consider many relevant factors in making recommendations about filing patent applications and the SingHealth Patent Review Committee assists SHIP in supporting the patent applications with the best chance of commercialisation.

Will SHIP initiate or continue patenting activity without an identified licensee?

Yes, SHIP accepts the risk of filing a patent application before a licensee has been identified. After SingHealth's patent rights have been licensed to a licensee, the licensee generally pays the patenting expenses, especially where the licence is exclusive. At times SHIP must decline further patent prosecution after a reasonable period (often a year or two) of attempting to identify a licensee, or if it is determined that we cannot obtain reasonable claims from the patent office. The SingHealth Patent Review Committee supports SHIP in making these decisions.

Other intellectual property

Copyright and Trademarks

What is copyright and how is it useful?

Copyright is a form of protection provided by the laws of Singapore to the authors of "original works of authorship." This includes literary, dramatic, musical, artistic, and certain other intellectual works as well as computer software. This protection is available to both published and unpublished works. The Copyright Act generally gives the owner of copyright the exclusive right to conduct and authorize various acts, including reproduction, public performance and making derivative works. There is no need to register copyright.

How do I represent a proper SingHealth copyright notice?

Although copyrightable works do not require a copyright notice, we recommend that you use one. For works owned by SingHealth, use the following format:

© [Year of first publication] Singapore Health Services Pte Ltd.
(e.g., © 2018 Singapore Health Services Pte Ltd).

Translational funding

What is a trademark and how is it useful?

A trademark includes any word, name, symbol, device, or combination, that is used in commerce to identify and distinguish the goods of one manufacturer or seller from those manufactured or sold by others, and also to indicate the source of the goods. In short, a trademark is a brand name. A service mark is any word, name, symbol, device, or combination that is used, or intended to be used, in commerce to identify and distinguish the services of one provider from those of others, and to indicate the source of the services.

What is trademark registration?

Office of Singapore (IPoS) provides a determination of rights based upon legitimate use of the mark. However, it is not necessary to register a trademark to prevent others from infringing upon the trademark. Trademarks generally become protected as soon as they are adopted by an organization and used in commerce, even before registration. You can help protect your trademark by adding the trademark symbol after the trademark you intend to use. For example: **TestMark™**



What is translational research?

Translational research involves applying the basic research findings of healthcare research for practical purposes aimed at benefiting patients and healthcare professionals. It involves de-risking the technology to make it attractive for commercial partners to become involved and develop the technology into a market-ready product.

How does translational funding differ to basic research funding?

Translational research funding is directed towards the activities in the process of translational research. The goal of translational funding is to enable the research team to achieve an applied or practical outcome from their research.

In contrast, basic research funding is oriented towards activities in the process of scientific research, where the aim of the research is primarily to establish, validate and build on specific principles of science.

In some cases, basic research funding can lead to the proving of fundamental scientific principles where these results can later be applied to solve practical problems. Where basic research is the first step before a practical outcome can be achieved by the researchers, it is generally appropriate to apply for basic research funding before moving on to seeking translational funding sources.

Thus, although they are distinct types of research funding with different objectives, basic research funding often dovetails into translational research funding.

What is Background and Foreground IP?

Translational grant applications often ask you to identify the Background IP and Background IP is the existing IP, relating to work created before or independently of a particular research project. It is the IP that exists at the start of the project. Background IP is used in the research project and can be brought into the project by one or more of the parties to the project.

Foreground IP is typically generated during the particular research agreement or project. Foreground IP generally relates to new developments made under a project. When working on a project which has translational funding, it is important to liaise early in the process with SHIP if patentable Foreground IP is generated.

Is a patent important for winning translational funding?

Usually translational funding agencies are keen to see either a filed patent application or a patent position behind the project. A patent position is the state where a patent application has not yet been filed (a reason may be that not enough preliminary data has been gathered) but the ability to file still exists (for example, the invention has not been disclosed etc). If a patent application has been filed, you should note this and its details in the application. SHIP can provide these details to you.

Do I need industry partners involved for a translational grant?

Each translational grant is different in terms of their requirement for industry involvement. However, sometimes a letter of intent from a potential industry

partner indicating co-development interest may strengthen your application. It's best to liaise directly with the funding body to ascertain this if you are unsure.

How can I strengthen my translational research funding application?

A key recommendation is for the researcher to contact their technology transfer office early in the process of seeking translational funding. SHIP can assist researchers to carry out due diligence for their technical concept, and can work with the researchers and patent professionals (as required) to define the patentable aspects of their invention. SHIP also carries out commercialisation activities for SingHealth IP, and so can support with drafting the commercialization section of your application.

What types of translational funding are available?

The SingHealth Office of Research sends out a weekly e-bulletin that details the closing dates of all research funding available, including translational funding that are most appropriate for your project in terms of timing, quantum and eligibility.



Prototyping

What is prototyping?

A prototype is an early sample, model, or release of a product built to test an idea or concept or process. It is a draft version of a product that allows you to explore your ideas and concept before investing time and money into development. It is much cheaper to change a product early in the development process than to make change after you develop the idea. A prototype can range from a visual (size and appearance only) to proof of concept (some key functionality) to a functional (near final product) prototype.

What is the SingHealth Medical Technology Office (MTO)?

The MTO is a core platform under SingHealth Office of Research that exists to create solutions to unmet clinical needs. The MTO is engaged in the process of bringing innovative new solutions to the bedside. This involves a process of discovering and validating unmet clinical needs, innovating new solutions, prototyping and guiding engineering development, engaging in risk assessment and ISO13485 requirements, and finding strategies to move solutions through the regulatory and reimbursement process to actual use in clinical settings with industry buy-in. While they have focused mainly on devices, they also handle projects involving diagnostics or apps.

The MTO comprises engineers, clinicians and scientists with industry and/or startup experience, who have been trained in the Stanford Biodesign systematic approach to medtech innovation. The office follows the ISO13485 requirements for quality management of medical device design and development. Their skillsets are in various engineering domains, such as mechanical, electrical, computer, chemical, biomedical, etc.

The MTO provides services in project management, quality control and documentation, risk evaluation, regulatory requirements, reimbursement strategy and towards medtech commercialisation. They are in touch with a wide network of researchers, scientists, investors, entrepreneurs, companies and organizations in the local and regional medtech ecosystem.

What prototyping resources are available?

The MTO is equipped with a prototyping studio, including rapid prototyping (3D printing), breadboard electronics equipment, soft prototyping tools and consumables, and computer-aided design software. Based on the scope of work, project teams may hire MTO services for project consultancy, prototyping services or use the studio with prior arrangement.

How can I benefit from working with the MTO?

- **Have an unmet need?**

We can attach engineers to shadow you and/or your department and identify interesting clinical needs to work on together. The MTO can brainstorm with you to validate your clinical need by doing a study of the market and stakeholders and shape your project to secure grant funding.

- **Have an existing project?**

We can link you up with engineers and scientists in the wider academic and research community or industry. MTO can help to conceptualize a solution of your idea for grant applications, and/or position your project for further funding and development.

- **Already thought of a solution?**

The MTO can assist to technically evaluate your proposed solution, create CAD images, generate visual and/or proof of principle prototypes, identify prototyping vendors for you, and help to plan the development pathway for your solution. We can guide you through the documentation and potential regulatory requirements needed and bring it through development to reach a commercial exit.

Contact

Contact the MTO to discuss your project at:

mto@singhealth.com.sg.

Marketing an Invention

How does SHIP market my inventions?

SHIP uses many sources and strategies to identify potential licensees and market inventions. Most often, existing relationships of the inventors with companies, the SHIP team, and other researchers are useful and market research can assist in identifying prospective licensees. We can use technology marketplace websites to post inventions, leverage conferences and industry events, and make direct contacts. The research team's publications and presentations are often excellent marketing tools as well as relevant industry partners often attend academic conferences.

How are most licensees found?

International studies of academic licensing have shown that 70% of licences result from contacts already known by the inventors. Thus research, consulting relationships, alumni, and even former students and postdocs, are often a valuable source for identifying licensees. Licensees are also identified through existing relationships of the SHIP staff and our licensees often license more than one technology from SingHealth. We attempt to broaden these relationships through contacts obtained from website posting inquiries, market research, industry events, conferences and the cultivation of existing licensing relationships.

How long does it take to find a potential licensee?

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 SingHealth inventions tend to be very early stage in the development cycle and thus require substantial commercialisation investment, making it difficult to immediately attract a licensee.

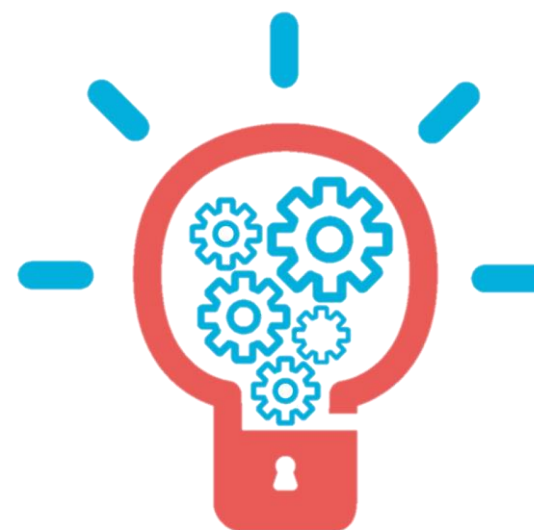
How can I assist in marketing my invention?

Marketing is the process of matching an invention to an outside company. Your research and consulting relationships can be helpful in both identifying potential licensees and technology champions within companies. Conferences are often an excellent way to identify companies (and therefore potential licensees) in your field. Once interested companies are identified, the inventor is the best person to describe the technical details of the invention and its advantages, and SHIP is best placed to negotiate the commercial terms.

The most successful technology transfer results are obtained when the inventor and SHIP work together as a team to market and sell the technology. If you are involved in marketing activities, do remember to keep confidential any aspects of the invention that have not been covered in a filed patent application. Disclosures to third persons, including potential licensee companies, before specific subject matter is filed may lead to the subject matter being considered not new by a patent office and compromise a patent position. The use of non-disclosure agreements can be used to cover discussions with third parties during the patenting process.

Can there be more than one licensee?

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





Licensing

How is a company chosen to be a licensee?

technology for the benefit of the general public. 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 for SHIP (or indeed any Technology Transfer Office) to have multiple potential licensees bidding on an invention.

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

Under SingHealth policy, a share of any financial return from a licence is provided to the inventor(s) which is detailed in the SingHealth Intellectual Property Policy. 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 be funded by the licensee.

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

Many licensees require the active assistance of the inventor to facilitate the transfer of the technology and their commercialisation efforts, at least at the early stages of product development. This can range from infrequent, informal contacts to a more formal consulting relationship to additional sponsored research in the inventor's laboratory.

What activities do the licensees typically undertake during commercialisation?

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. Medical products (therapeutics, diagnostics and devices) require extensive animal and clinical trials in humans to achieve regulatory approval. Software used in certain medical applications may also require regulatory approval.

What is my role during commercialisation?

Your role can vary depending on your interest and involvement, in 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 will happen to my invention if the licensee is unsuccessful in commercialising the technology?

Licences typically include financial payments and performance milestones that, if unmet, can result in termination of the licence. This termination allows for subsequent licensing to another commercial partner. While licensees usually can terminate at will, generally, SingHealth is only able to terminate if the licensee is not performing under the agreement.

Start ups

What is a start up company and why choose to create 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.

What role does an inventor usually play in a start up?

SingHealth staff typically serve as technology or clinical consultants, advisors or in some other technical developmental or clinical capacity. Rarely do staff members choose to leave SingHealth and join the start up full-time. In many cases, the start up investors and management team 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. Staff involvement of any kind in a start up is reviewed by the SingHealth Conflict of Interest Committee.

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 SingHealth staff 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 SingHealth processes, such as Conflict of Interest reviews.

Who decides whether to form a start up?

The choice whether to license to a start up for commercialising IP is a joint decision made by SHIP and the inventors. The start up is usually formed by the inventors outside SingHealth and SHIP will then license the patent application of the inventors to the start up on commercial terms. A few key factors when considering whether a technology is suitable for a start up are:

- The problem (the technology must address a significant clinical/industry need)
- Available licensees (if there is a licensee, it is logical to license the technology, rather than build a start up)
- Development risks and costs versus investment return (often companies in established industries are unwilling to take risk; the investors must obtain their needed rates of return)
- Potential for multiple products or services from the same technology (few companies survive on one product alone)
- Sufficiently large competitive advantage (as opposed to an incremental advantage over existing technologies)
- Target market (niche markets don't typically attract investors as they are looking for a sizeable addressable market)
- Potential revenues sufficient to sustain and grow a company
- Experienced team in the start up (it is critical that the start up is built from a team with the right experience or even the most disruptive technology may be a commercial failure. As the saying goes, it is better to have an A-grade team with a C-grade technology, than the reverse).

Will SingHealth pay for or lead the incorporation of a start up company?

No, not usually. As a separate entity, the start up will pay for its own legal matters, including all business incorporation matters and patent and licensing expenses. SHIP may be able to direct you to resources within the Singapore ecosystem to support your efforts with the start up process.

Can SingHealth accept equity in the company?

SingHealth can accept equity as part of the financial terms of a licence. Equity may be substituted for other cash considerations that are often difficult for start ups. It is also a way for SingHealth to share some of the risk (and potential reward) associated with start ups. A decision to take equity must make sense for both SingHealth and the company.



What types of revenues are generated if commercialisation is successful?

Most licences have licensing fees that are very modest (e.g. for start ups or situations in which the value of the license is deemed to warrant a modest licence fee) or can reach hundreds of thousands of dollars. Additional revenues from annual minimums and payments upon achievement of certain milestones may also result prior to actual sales of the licensed product.

Royalties on the eventual sales of the licensed products can generate revenues, although this can take years to occur and depends upon the type of technology. Equity, if included in a license, can yield returns, if a successful equity liquidation event occurs.

Most licenses do not yield substantial revenues. In the most recent Association of University Technology Managers annual survey of U.S. Universities (2014), less than 1% of all licenses yielded over \$1 million annually. However, the rewards of an invention reaching the market are often more significant than the financial considerations alone.

How are licence revenues distributed?

Under the SingHealth Intellectual Property Policy, revenues from licence fees, royalties and equity — minus any unreimbursed patenting and file expenses and

an overhead of 15% — are shared with inventors, their institutions and SingHealth as below:

50% to inventor* 40% to institution of inventor 10% to SingHealth

**When the invention is created by more than one inventor, this 50% shall be divided equally amongst the inventors unless SHIP receives prior written notice signed by all the inventors advising a different sharing allocation.*

How are inventor revenues distributed if there are multiple inventors and/or multiple inventions in a licence?

When a licence is completed, any revenue is distributed based on the inventive contributions listed in the Invention Disclosure Form relating to the licensed technology, unless SHIP receives prior written notice signed by all inventors.

How is equity from a licence to a start up distributed?

Equity owned by SingHealth is held in a SingHealth-owned holding company set up for this purpose. When the equity is monetised by SingHealth, the resulting funds are distributed in accordance with the revenue-sharing formula under the SingHealth Intellectual Property Policy.



Conflict of Interest

What kinds of Conflict of Interest (COI) issues concern SingHealth?

Examples include the appropriate and objective use of research, , clinical use of patients, the treatment and roles of students, supervision of individuals working at both SingHealth and a licensee company, treatment of patients during clinical trials, and conflict of commitment (i.e., your ability to meet your SingHealth obligations).

What are examples of a conflict of commitment?

A conflict of commitment may exist if duties, assignments or responsibilities associated with a technology licence or outside business arrangement have a negative impact on your ability to meet commitments associated with your SingHealth employment or exceed the amount of time available to you for these activities. The best approach is to fully disclose your situation to the head of your Institution and discuss the implications for your job responsibilities.

How does SingHealth define a COI?

A COI can occur when a SingHealth employee, through a relationship with an outside organization, is in a position to: i) influence SingHealth's business, research or other areas that may lead to direct or indirect financial gain; ii)

adversely impact or influence research or teaching responsibilities; or iii) provide improper advantage to others to the disadvantage of SingHealth.

How does SingHealth manage potential conflicts associated with technology transfer transactions?

SHIP staff can advise you on COI issues and support you if you need to present to the COI Committee. It is the responsibility of the staff member to disclose and document any outside arrangements that constitute disclosable situations or interests as described in SingHealth Conflict Of Interest Policy. Whenever a question or uncertainty arises, you should seek guidance from your head of Institution for research-related issues and/or your SHIP case manager for licence-related issues.



The SingHealth Guide for Inventors is one of many resources available to help better protect the intellectual property assets you generate and maximise their commercial value.

For access to additional resources or guidance, please get in touch with SHIP. We will be happy to connect you to useful contacts and discuss various IP, funding and commercialisation options with you. Technology development is hard work so we aim to support you on the journey.

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