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The IP  
Navigators



UNSW  
SYDNEY

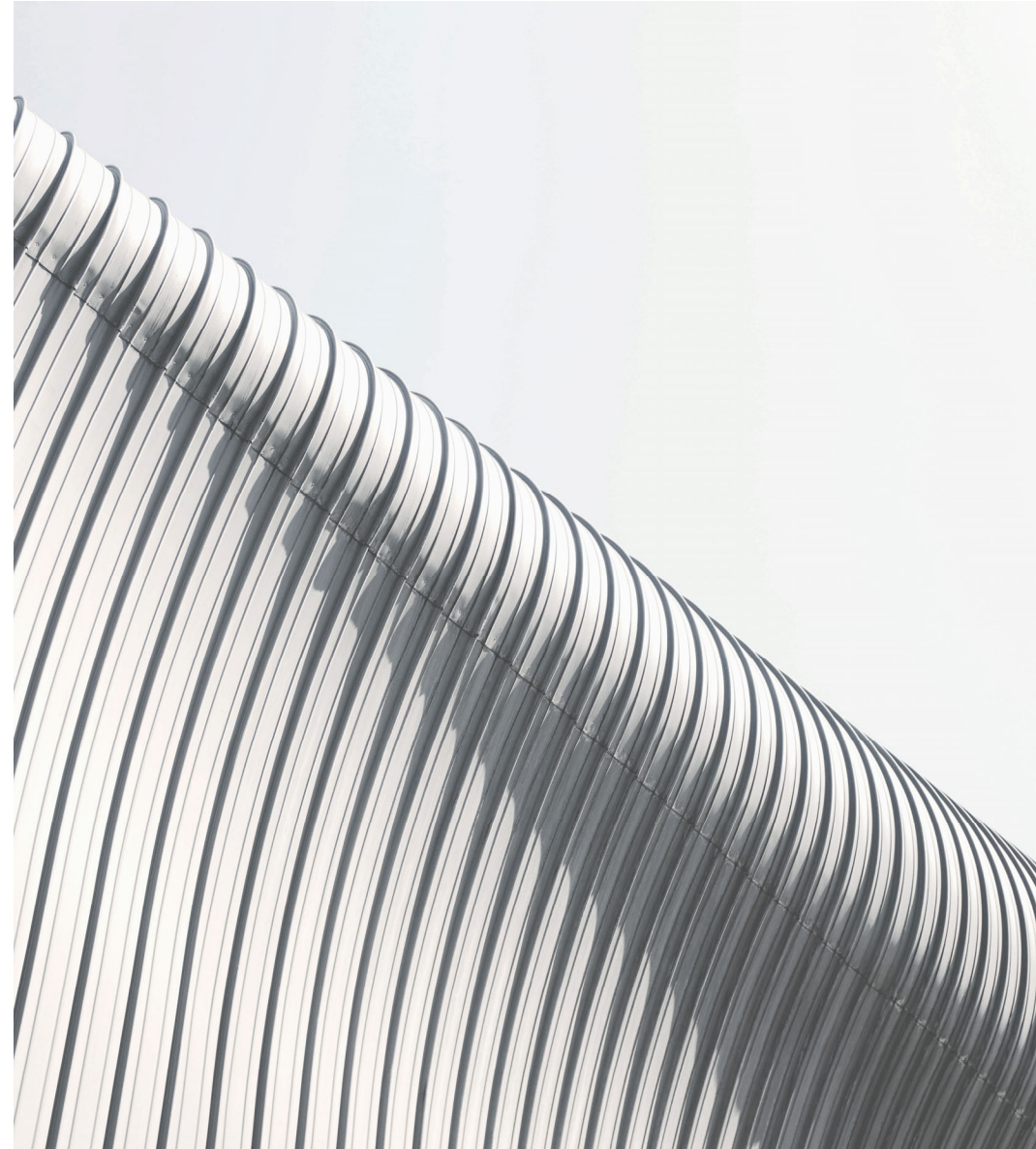
UNSW School of Photovoltaic and Renewable  
Energy Engineering

# IP overview

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Eddie Walker, FB Rice

15 November 2023



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## Acknowledgement of Country

We acknowledge the Traditional Custodians of country throughout Australia and their connections to land, sea and community.

We pay our respect to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

#### Disclaimer

The content of these materials is general in nature, and must not be relied on in lieu of advice from a qualified professional in respect of your particular circumstances. To the maximum extent permitted by law, FB Rice does not make, and excludes, any representation or warranty, express or implied, as to the accuracy, reliability, currency or completeness of any information in these materials and FB Rice (collectively, with its partners, officers, directors, employees, agents and advisers) expressly disclaims any and all liability for any loss or damage, howsoever caused, relating to these materials or from acting in reliance on the information within them. For the avoidance of doubt, the delivery of these materials, or the provision to you of any part of its content, does not create an attorney-client relationship between you and FB Rice.

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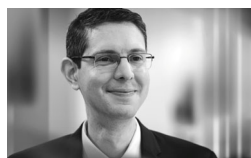
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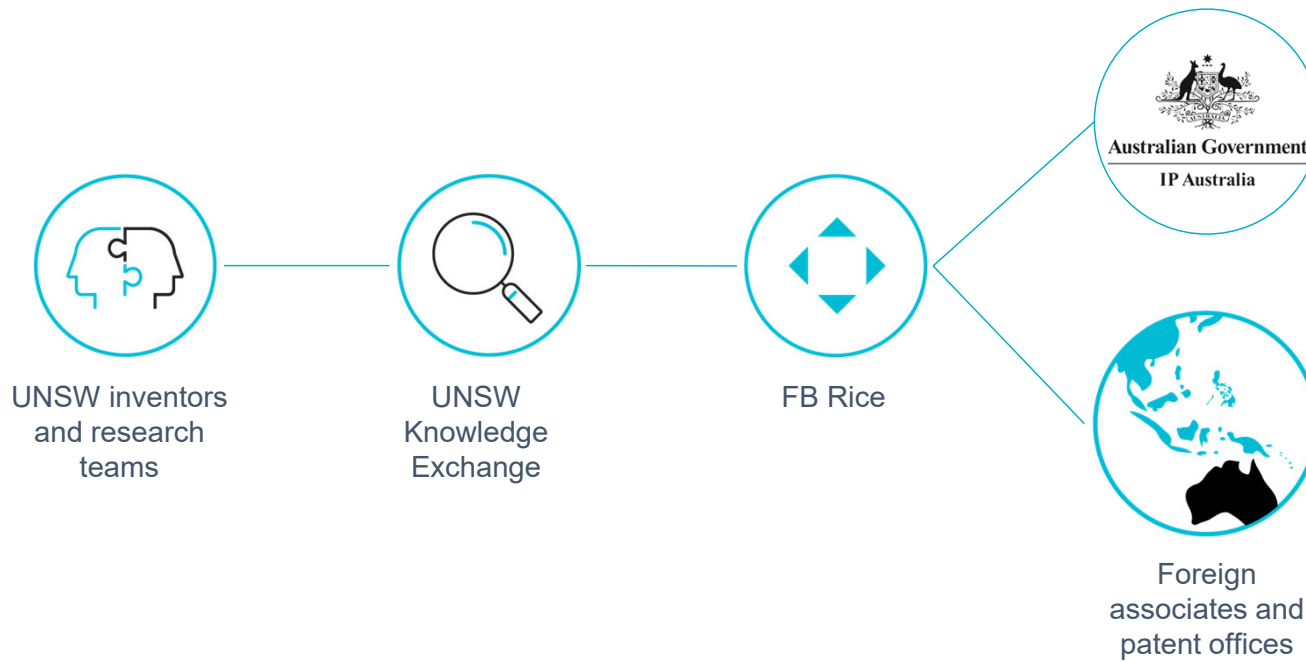


Kate Baumann  
Associate



# Champion innovation and create value

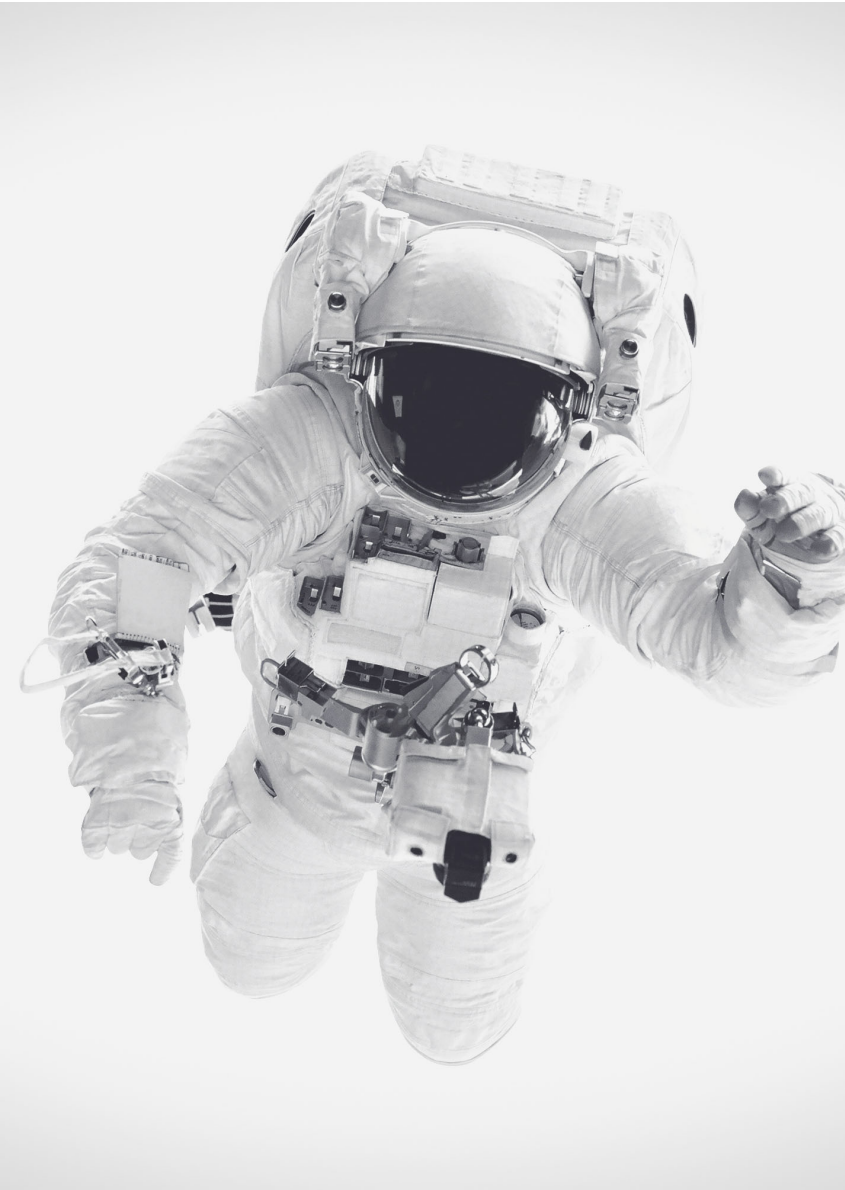
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# Types of IP



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## Intellectual property

“creations of the mind”

“products of human intelligence and creation”

“intangible property that is the result of creativity”

## Types of intellectual property

### Registrable

- Patents
- Trade marks
- Registered designs

### Non-Registrable

- Copyright
- Trade secrets





## Registered designs

- Protect the visual appearance of a product
- Design must be *new* and *distinctive* at the time of filing
- Lasts between 10-25 years depending on country

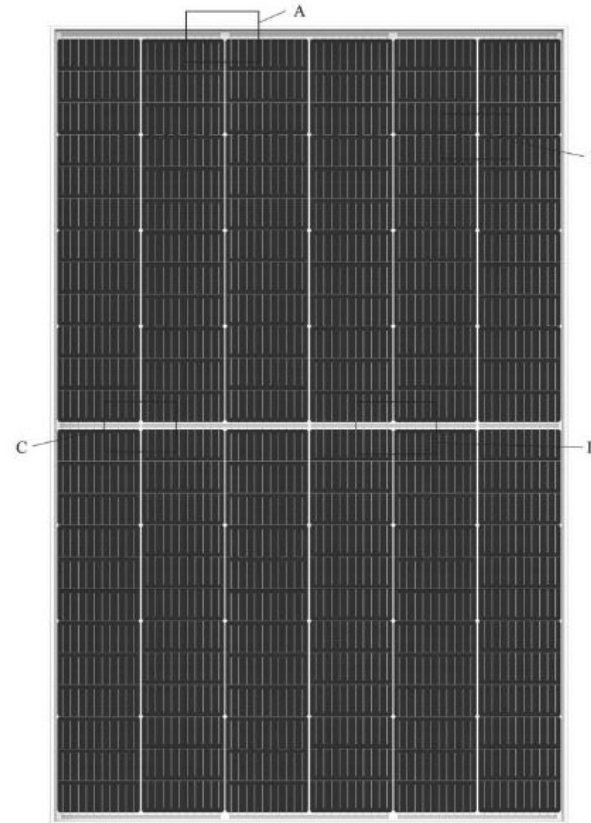


Figure 1



Figure 8

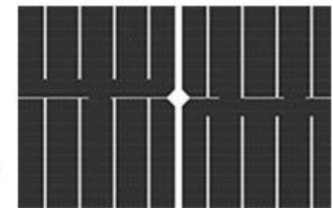


Figure 9

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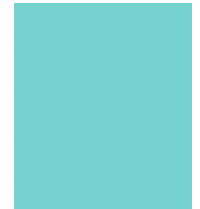
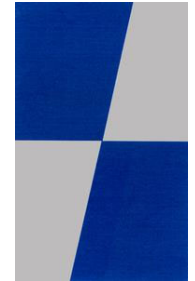
## Trade marks

Any element (sign) used to distinguish your products/services from those of a competitor:

- Words
- Devices, logos
- Packaging, labels, getup
- Taglines
- Sounds, smells, colours, shapes



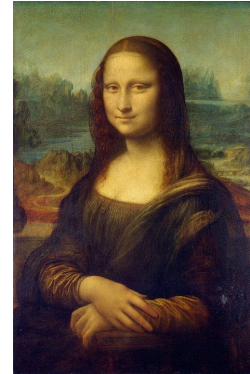
X Q VZ



**BECAUSE YOU'RE WORTH IT**

## Copyright

- Protects the copying of an author's creative output
- Drawings, art, music, literature, computer programs, typographical arrangements, journal articles
- Only infringed if you can prove copying of a substantial part of the work



### RESEARCH ARTICLE

**ADVANCED MATERIALS**  
www.advmat.de

## Bifacial and Semitransparent $\text{Sb}_2(\text{S},\text{Se})_3$ Solar Cells for Single-Junction and Tandem Photovoltaic Applications

Chen Qian, Kaiwen Sun,\* Jialin Cong, Huiling Cai, Jialiang Huang, Caixia Li, Rui Cao, Ziheng Liu, Martin Green, Bram Hoex,\* Tao Chen,\* and Xiaojing Hao\*

Thin-film solar cells are expected to play a significant role in the space industry, building integrated photovoltaic (BIPV), indoor applications, and tandem solar cells, where bifaciality and semitransparency are highly desired.  $\text{Sb}_2(\text{S},\text{Se})_3$  has emerged as a promising new photovoltaic (PV) material for its high absorption coefficient, tunable bandgap, and nontoxic and earth-abundant constituents. However, high-efficiency  $\text{Sb}_2(\text{S},\text{Se})_3$  solar cells exclusively employ monofacial architectures, leaving a considerable gap toward large-scale application in aforementioned fields. Here, a bifacial and semitransparent  $\text{Sb}_2(\text{S},\text{Se})_3$  solar cell and its extended application in tandem solar cells are reported. The transparent conductive oxides (TCOs) and the ultrathin inner n-i-p structure provide high long-wavelength transmittance. Despite the MnS/ITO Schottky junction, power conversion efficiencies (PCEs) of 7.41% and 6.36% are achieved with front and rear illumination, respectively, contributing to a great bifaciality of 0.86. Consequently, the reported device gains great enhancement in PV performance by exploiting albedo of surroundings and shows exceptional capability in absorbing tilt incident light. Moreover, an  $\text{Sb}_2(\text{S},\text{Se})_3/\text{Si}$  tandem solar cell with a PCE of 11.66% is achieved in preliminary trials. These exciting findings imply that bifacial and semitransparent  $\text{Sb}_2(\text{S},\text{Se})_3$  solar cells possess tremendous potential in practical applications based on their unique characteristics.

silicon solar cells, including lightweight, flexibility, and potentially low costs. These distinctive qualities enable them to be an important complement in some specialized application scenarios where crystalline silicon solar cells are not competent, such as the space industry, BIPV and functional indoor applications. High-efficiency thin-film solar cells have historically been monofacial and opaque due to the use of metal contacts for both a substrate as well as superstrate configuration. Consequently, they cannot meet the requirement of semitransparency for BIPV windows<sup>[1,2]</sup> and top cells in tandem solar cells and the capability of performing well under non-normal and diffuse incident light. Thus, semitransparency and bifaciality are crucial features for thin-film solar cells to function as an essential complement to silicon solar cells.

The concept of bifacial solar cells was first proposed and discussed in the 1960s as a feasible technique to further raise the energy yield and potentially allow solar cells to surpass their single junction Shockley-Queisser limit.<sup>[3]</sup> The first bifacial solar cell

## Trade secrets

- Company policies, non-disclosure agreements



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# Patents

# Patents

- A patent is a right that is granted for something that is new, inventive, and useful
- Lasts up to 20 years from filing

Protects, for example:

- Systems
- Manufacturing processes
- New devices

Things that are “technical” Things that produce an “Artificial State of Affairs”



**(12) United States Patent**  
**Wenham et al.**

(10) Patent No.: **US 7,998,863 B2**  
(45) Date of Patent: **Aug. 16, 2011**

(54) **HIGH EFFICIENCY SOLAR CELL FABRICATION**

(75) Inventors: **Stuart Ross Wenham, Sydney (AU); Ly Mal, Sydney (AU); Nicole Bianca Kuepper, Sydney (AU); Budi Tjahjono, Sydney (AU)**

(73) Assignee: **Newsouth Innovations Pty Limited, New South Wales (AU)**

(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 98 days.

(21) Appl. No.: **12/125,827**

(22) Filed: **May 22, 2008**  
(Under 37 CFR 1.47)

(65) **Prior Publication Data**  
US 2009/0008787 A1 Jan. 8, 2009

**Related U.S. Application Data**

(63) Continuation-in-part of application No. PCT/AU2006/001773, filed on Nov. 24, 2006.

(30) **Foreign Application Priority Data**

Nov. 24, 2005 (AU)	2005906552
Nov. 29, 2005 (AU)	2005906662
Apr. 11, 2006 (AU)	2006901903

(51) **Int. Cl.**  
*H01L 21/44* (2006.01)

(52) **U.S. Cl.** 438/675; 438/694; 257/E21.249

(58) **Field of Classification Search** 438/675, 438/694  
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS  
4,419,811 A 12/1983 Rice  
4,459,605 A 7/1984 Rice

4,920,402 A \* 4/1990 Nakaya et al. 257/773  
5,701,264 A 12/1997 Shrivastava et al.  
6,423,567 B1 \* 7/2002 Ludemann et al. 438/80  
6,696,325 B1 2/2004 Kanbe et al.  
6,799,963 B1 3/2004 Halderman et al.  
6,746,766 B1 4/2004 Gimert et al.  
6,811,670 B2 \* 11/2004 Liu et al. 205/123  
2003-0183677 A1 10/2003 Farrar et al.  
2004-0077112 A1 4/2004 Elliott  
2005-0015175 A1 1/2005 Huang  
2006-0061270 A1 \* 3/2006 Thilig et al. 313/506  
2008-0166832 A1 \* 7/2008 Young et al. 438/73

**FOREIGN PATENT DOCUMENTS**

EP	0 851 511 A	7/1998
GB	2172747 A	9/1996
WO	WO/2005/028920 A1	3/2005

**OTHER PUBLICATIONS**

Gao, J. H. et al., "Metalization Improvement on Fabrication of Interdigitated Backside and Double Sided Buried Contact Solar Cells", Solar Energy Materials and Solar Cells, Elsevier Science Publishers, Amsterdam, NL, vol. 86, No. 4, Apr. 1, 2005 pp. 485-498.

Yamashe, H. et al., "Selective Etching of Phosphonate glass with Low Pressure Vapor HF", Journal of the Electrochemical Society, Electrochemical Society, Manchester, New Hampshire, vol. 142, No. 1, Jan. 1, 1995, pp. 237-243.

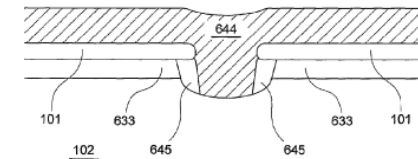
Green, M. A. et al., "Crystal line silicon on glass (CSG) thin-film solar cell modules", Solar Energy, Pergamon Press, Oxford, GB, vol. 77, No. 6, Dec. 1, 2004, pp. 857-863.

\* cited by examiner

Primary Examiner — Thanh Nguyen  
(74) Attorney, Agent, or Firm — Vedder Price PC; Thomas J. Kowalski; Heidi Lunasin

(57) **ABSTRACT**  
A method of forming a contact structure and a contact structure so formed is described. The structure contacts an underlying layer of a semiconductor junction, wherein the junction comprises the underlying layer of a semiconductor material and is separated from an overlying layer of semiconductor material by creating an undercut region to shade subsequent metal formation. Various steps are performed using inkjet printing techniques.

**19 Claims, 36 Drawing Sheets**



## Patentable subject matter

What kind of things are not patentable?

- Human beings or the biological process for their generation
- Artistic creations
- Discoveries with no means of putting them into effect
- Abstract ideas, schemes or plans



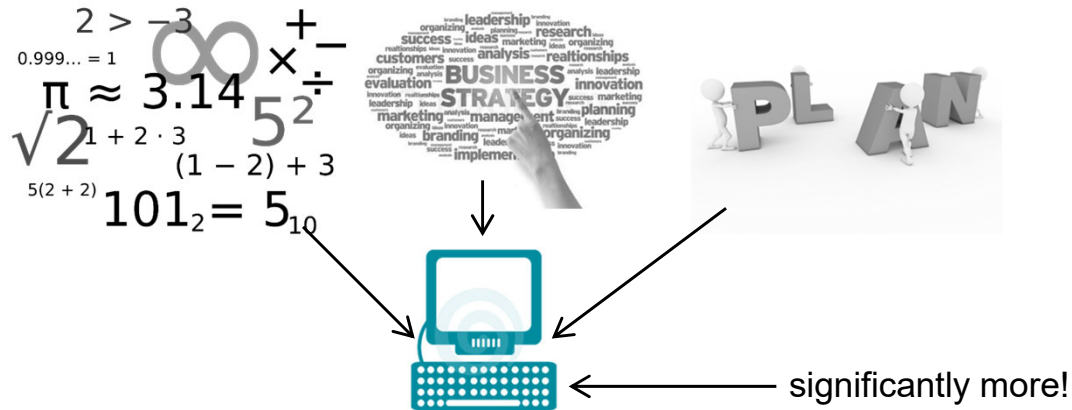
## Methods of treatment and diagnosis

- Many countries do not allow methods of treatment or diagnosis, which involve one or more steps carried out on a human, to be patented.
- Have to rely on protection for apparatus/device features only



## Software inventions

- Computer programs as such are generally excluded from patentability
- But if the substance of the invention is something significantly more than computerisation of an abstract idea then a patent may be granted



## Software inventions



## Structure of a patent

- Title
- Background – problem being addressed/ prior art
- Summary
- Detailed description - working of the invention
- Claims – scope of protection
- Drawings – of the proposed system and results
- Abstract

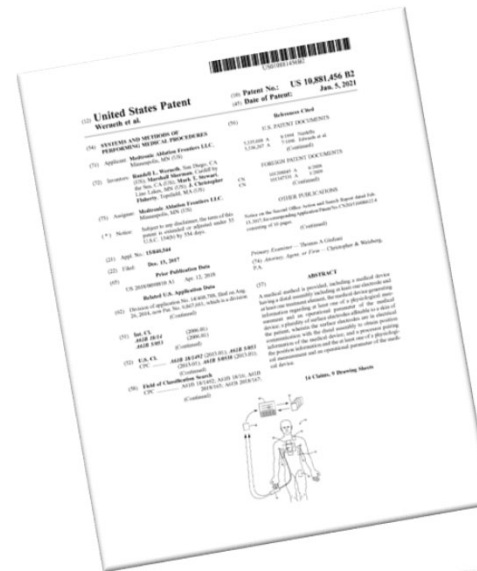
## Novelty and inventive step

For a patent to be granted, the invention as defined in the claims must be:

- New (novel)
- Non obvious (possess inventive step)
  
- Assessed in light of the 'prior art'

## Examples of prior art

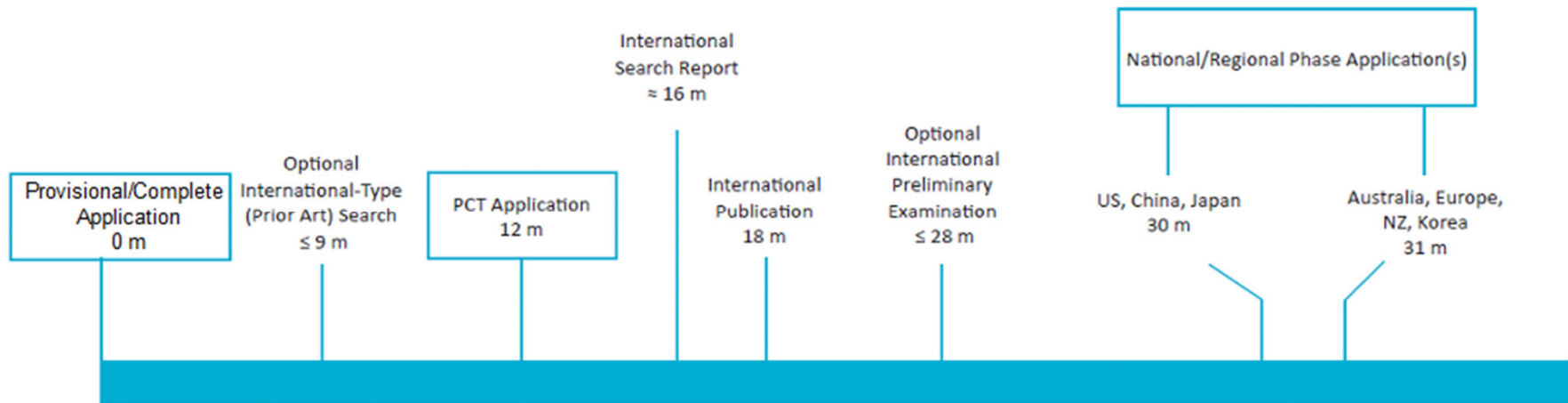
- Earlier patent documents
- Journals, books and other publications
- Information on the internet
- Disclosures during public meetings and conferences



## Keep things secret!

- You shouldn't talk about new developments to any third parties until you have considered the IP position
- If in doubt, talk to Knowledge Exchange

# Patent process



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# Patent rights and limitations



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True or false?

If you have a patent that  
covers your product you are  
free to exploit your product



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True or false?

If someone has a patent that your product would infringe, you can't get your own patent for your product



## Patent rights – an example

Apple has invented the “Touch ID fingerprint scanner” and patented its invention

A startup has invented the “Touch ID health monitor”, which allows a person’s health to be analysed wherever they use a fingerprint scanner

- The start up may be able to get a patent for the new invention (because the new health monitoring technology is new and not obvious)
- But they cannot exploit the technology without permission from Apple as they rely on Apple’s broad specific scanning technology to implement their invention



## Patent rights - limitations

- A patent gives the right to exclude others from making, selling, using, importing etc. an invention as claimed in the patent
- A patent does NOT give a right to exploit the invention – check existing patent rights to determine whether there is freedom to exploit an invention
- A patent does NOT prevent others from getting a patent, if there is also something new and inventive about their product

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# Patent searching

## Types of patent searches – Novelty search

- Also called a patentability search
- Identify what aspects of an invention are new
- Helps understand the likelihood of a patent application
- May also be used as a basis for contesting the validity of someone else's patent



## Types of patent searches – Infringement search

- Also called a Freedom-to-Operate (FTO) or clearance search
- Identify what aspects of a product or process might infringe the patents of others
- The search does not necessarily focus on inventive aspects of the product or process



## Novelty search vs infringement search

	Novelty search	Infringement search
<b>Purpose</b>	Determine whether technology could be patentable	Determine whether technology could infringe the IP rights of others
<b>When to action</b>	Before or at early stage of patent application process	At any stage during product development
<b>Technical focus</b>	Any aspects of the technology considered unique	Any aspects of the technology, including manufacturing processes
<b>Document focus</b>	Any published documents, including patents, journals, web articles, etc.	Granted and pending patents only
<b>Geographical focus</b>	Anywhere in the world	Countries of commercial interest
<b>Cost</b>	Lower	Higher



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# Inventorship and ownership

## Why do we care about inventorship?

- Inventors are the first owners of an invention
- Agreements are established to transfer ownership from inventors to other parties





## Identifying inventive contribution

### Australia:

- Did a person's contribution have a material effect?
- Would the invention have come about without the person's contribution?

### Not an inventor if:

- Merely following instructions
- Performing routine work
- Constructing a product to another person's design
- Only a figurehead

## Who owns the invention?

Depends on agreements put in place between the inventors and one or more parties:

- Contract of employment
- Consultancy agreement
- IP-specific assignment

Companies and research institutes take steps to ensure that, if appropriate, they own the technology and inventions that are developed by employees, consultants, third parties.

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Why does UNSW  
protect IP and what  
is the approach?

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True or false?

A patent is worthwhile only if you can afford to take big companies to court



## Why have IP?

IP is a property that can:

- prevent or deter infringement or theft by others
- be sold or licensed to partners
- form the basis of a start-up/spinout
- help securing investment and funding

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# UNSW IP Management Process



DISCLOSE



REVIEW



PROTECT

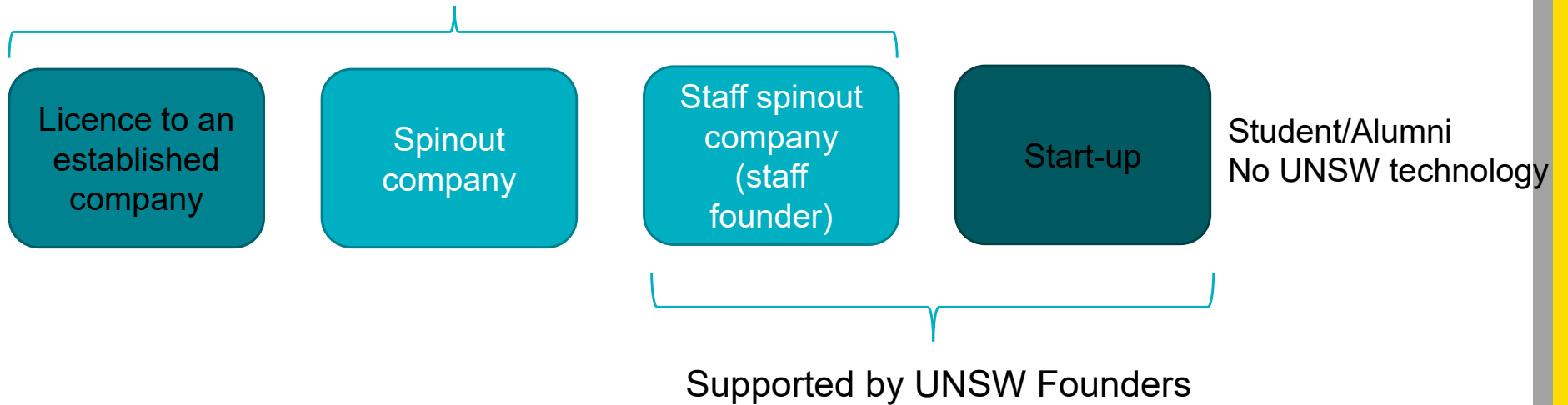


COMMERCIALISE



# UNSW Pathways for Commercialisation

Based on UNSW developed technology/IP  
Supported by KE



# Establishing a Staff Spinout



You develop intellectual property with commercial value and would like to consider founding a company, i.e. a Staff Spinout.

1

You lodge the idea through the Knowledge Exchange (KE) inventor portal.



[unsw.to/staff-inventor-portal](http://unsw.to/staff-inventor-portal)

2

3

A Business Development Manager (BDM) from KE will meet with you to discuss your idea and commercial plans.

4

The BDM presents the idea and the commercial plan to the Technology Review Committee (TRC).

The TRC will review and decide on an IP strategy that would support the commercialisation plan/business plan.

KE will confirm endorsement from your HoS/supervisor.

5



The BDM introduces you to a Founders Program Manager within UNSW Entrepreneurship who can provide support through all stages of the commercialisation journey.

Including business idea validation, customer discovery, developing a go to market plan and compiling an investor pitch.

6

You present the idea as an investor pitch to the Staff Spinout Review Committee (SSRC).

Including your proposal of how the company will interact with UNSW and how conflicts of interest will be managed.

The SSRC will consider and recommend whether the spinout is a feasible option for the IP.

7

Sign Option Agreement.

This gives you the ability to engage with investors and the market before committing to establish a spinout company.

8

You seek investment, test the market, develop your business plan and establish the company.

Alternatively you may decide that further R&D within UNSW is required, or that the commercial opportunity is not viable or practical.



9

Sign the template IP Licence and SAFE.

Finalise Conflict of Interest Disclosure and Management Plan (CoI) and Paid Outside Work approvals from HoS/supervisor. Support provided by KE and Enterprise Legal. Creator Waiver Letters required.

10

Keep in touch with KE and Founders throughout your entrepreneurial journey

11

You successfully commercialise technology!

FOUNDERS  
MAKE CHANGE HAPPEN



UNSW  
SYDNEY

For further information contact:

KNOWLEDGE EXCHANGE | FOUNDERS  
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## Summary

- Be aware of the different types of IP available and the value that protecting IP can bring to a project
- At every step and turn consider if you have come up with something that could or should be protected and discuss with Supervisors/Knowledge Exchange Team
- Don't publicise technical details of your work before the IP position is considered
- Be aware of both novelty and freedom to operate issues and the types of searching that may be carried out
- Understand the importance of identifying correct inventorship and ownership

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Any questions?

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