Open or Owned? A guide to intellectual property within iGEM

1. Foreword

When deciding whether to patent an idea, the rule of thumb is to file a patent before publishing it. Once an invention is public, others can build on it, and the inventor can no longer protect it. And yet, the iGEM competition is open by design: teams are required to share their work through the Wiki, the Parts Registry and the Grand Jamboree, and many teams also present at Mini Jamborees. Publishing is a core component of the iGEM, and therefore, subsequent decisions are those of timing: is any aspect of the invention worth protecting, and if so, how should a patent be filed before any work is made public?

This guide denotes the learnings of our team whilst working through these questions. We ultimately chose not to file, but undertaking this process reshaped our way of thinking about commercialisation, open-sourced material and idea ownership. Please note that no information presented here is of legal advice: we recommend teams to speak to their university/high school IP teams or a qualified patent attorney.

2. Our IP Journey

Our journey started off with the Imperial Enterprise Lab, a hub for entrepreneurship that runs advice sessions. We were recommended to meet with an IP clinic to gain an understanding of IP before approaching the university's IP team. We therefore met with Mr. Tom Furnival, a chartered patent attorney working for Mewburn Ellis LLP, a European patent and trademark firm run by the Chartered Institute of Patent Attorneys (CIPA) - the professional body for patent attorneys in the UK. Following Mr. Furnival's advice, we asked the Imperial IP Team (the Tech Transfer Office) to clarify the unusual status of iGEM innovations and presented what we learned to the whole team and discussed how to balance confidentiality against sharing technical detail with sponsors and stakeholders. This team connected us with patent attorney Dr. Ross Cummings at Gill Jennings & Every LLP to discuss IP issues involved in spinning out academic research into companies. To gain a firsthand perspective into how an iGEM project becomes a company, we then reached out to Mr. Henrik Hagemann, who was one of two members to spin the 2014 Imperial iGEM Project, which finished second in the competition, into Puraffinity LTD. Moreover, we interviewed Professor Salvador Ventura leading the Protein Folding and Conformational Diseases group at the Universitat Autònoma de Barcelona to help us identify the point of novelty in our project. Finally, an interview with Dr. Amritpal Singh, former iGEM judge and Non-Model Organism Lead on the iGEM Technology Committee, who underlined the importance of accompanying our business model design with IP decisions.

3. Patent Fundamentals

A patent is a legal tool used to prevent others from utilising an invention, granted in exchange for sharing how the invention works with the world. When interviewed, patent attorney Dr. Ross Cummings strongly emphasised this point, stating that a patent does not grant an individual the permission to use an invention - but rather offers the right to stop others from making, using or selling it without the owner's permission. Filing a patent itself may require permission, for example, when built on someone else's patented technology. In return for this exclusive right, the invention must be disclosed publicly in enough detail that a skilled person could reproduce it. Once the patent is expired, anyone can build upon it freely.

Patents therefore do not *directly* oppose open-science, but rather delay its forward movement, with a commercial window attached.

During another interview with a chartered patent attorney, Mr. Tom Furnival underlined UK patent-filing requirements in particular. Three key elements were highlighted, including **1) Novelty:** the invention must be new and must not have been disclosed prior to the filing date, including by the prospective owner, **2) Inventive:** the invention must not be obvious to a skilled person in the field, and **3) Sufficiency:** the application must describe the invention in enough detail to be carried out. The UK operates on a first-to-file system, meaning that two individuals that create the same invention independently would need to file the patent first for ownership rights, regardless of who created the invention first. Speed and secrecy are therefore essential. Mr. Furnival also described core components to include within patent application: background literature placing the invention in context, a summary of the invention itself, and the claims. Claims are especially legally important as they outline the boundary of what others can be prevented from doing.

4. iGEM Disclosure 'Traps'

Because every iGEM team must publish, the question posed is not whether work becomes public, but when. In patent law, work becomes public during the first 'enabling disclosure' - when enough detail is shared with someone not bound by confidentiality, for a skilled person to be able to reproduce the invention. Mr. Furnival confirmed that uploading to the Parts Registry, publishing work on the Wiki and presenting it at the Grand Jamboree and other conferences counts as enabling disclosure.

A common misunderstanding faced by teams is that they are allowed to prepare an application before the Wiki freeze and file straight afterwards. This application would fail for lack of novelty, as filing must precede the first enabling disclosure. In iGEM, this usually occurs well before the freeze, often in the form of an advisor discussion, a fundraising pitch, a poster at an outreach event, a social media post, a Mini Jamboree talk, a Registry Part documentation or a Wiki page that is visible whilst being drafted. Any act that reveals the core invention before filing would subject an application to failure due to a lack of novelty.

For a team considering filing a patent, we suggest planning the time of filing in several stages:

1) **Decide early:** Once the design is settled, decide as a team whether anyone would like to keep the option of a patent. If the answer is no, publish as openly as you would like.
2) **Map disclosure dates:** List every conference, outreach event, Parts Registry deadline, the Wiki freeze, etc using the current year's iGEM calendar and inner team schedule. The earliest event revealing the core invention would serve as a filing deadline. Prior to this date, the project problem, motivation and headline results can be presented in general terms lacking inventive detail. NDAs can be utilised for detailed conversations with advisors.
3) **Draft a patent application:** this can be done with a licensed attorney or the university IP team once supporting data is available, typically in late summer. Filing with a patent attorney from an IP clinic can be expensive (Section 6) and covered by your university IP Team, but keep in mind that the university will likely claim a portion of ownership to the invention in return.

4) **File before the earliest disclosure:** from the first day of filing (the ‘priority date’), the project will be considered ‘patent-pending’ and all details can be published on the Wiki, Parts Registry and presented at the Grand Jamboree, as required by iGEM.

5. Drafting a Strong Application

A strong patent application must balance breadth and evidence, as the broader the claim, the more evidence and reasoning needed to demonstrate the full scope of its potential. This is where the role of patent attorneys comes in, which are responsible for aiding individuals in drafting patent applications that can walk such a fine line. Firstly, Dr. Cummings explained that an application must contain sufficient information to support the invention. In engineering biology, this is generally demonstrated as wet lab results, with an idea on its own rarely being enough. This creates a timing difficulty for iGEM teams as the data needed to file is generated at the end of summer, just before the publishing deadlines. Secondly, a strong application is largely broader than the specific use case or dataset testing reported from the wet-lab evidence, given that it will likely be at its earliest stages. Dr. Cummings advises that the aim is to cover the downstream variants and improvements that competitors would otherwise make. A claim should not only describe a precise construct, but rather the general principle, so that a rival would require a license from the owner rather than being able to alter one component and subsequently utilise the invention.

6. Costs and Timelines

In the UK, a first filing costs approximately £8,000-£10,000. This initial step marks the priority date, which begins a clock that forces larger spending decisions within the following 12-30 months. From the priority date onward, the invention can be disclosed without affecting its novelty, and the project becomes patent-pending. Within these 12 months, individuals may choose to file patents in additional countries beyond the UK, which are anticipated to cost £5,000 per country - although exact figures will vary depending on the firm, situation complexity and country. Individuals may choose to file an international patent application within this 12-month period under the Patent Cooperation Treaty (PCT), which would allow them to seek simultaneous patent protection in over 150 countries through a single filing. If they select the PCT option, at 30 months from the priority date, the patent enters the ‘national phase’, where individuals would select the countries they would like to file in and pay respective fees then. Filing a PCT is not an international patent - but would rather defer country-by-country costs from month 12 to month 30. This time is particularly valuable if a team is still fundraising or analysing whether there really is a market large enough for their intended product. For an iGEM team that may lack funding, cost consideration is particularly important as the first filing alone can exceed the entire lab budget.

7. Inventorship is not Ownership

Dr. Cummings stressed that inventorship is determined by a contribution made to the inventive concept. Running the experiments, regardless of how long they took, does not always offer someone ‘inventor’ status. This can feel harsh in a team of 10+ students who have all worked hard on the same project who contribute in different ways. We later raised this Mr. Henrik Hagemann, the co-founder of Puraffinity LTD, and discussed how rigid this rule can be in deciding who is and is not credited. At our UK and EU Mini Jamboree, he reflected on it personally, sharing that only two members of the original 2014 Imperial iGEM Team went on to spin the project out into Puraffinity. During this process, he stressed the importance of having the tough conversations earlier on rather than later in order to maintain

transparency. After speaking to Dr. Cummings, we were even more careful to keep an up-to-date daily, signed and physical lab book alongside our electronic Benchling notebook. This would provide evidence of what, from the first brainstorm through to every lab session, was contributed from each team member if inventorship were ever to be disputed.

Although having several inventors on one patent is standard practice, ownership poses a separate question. Dr. Cummings explained that a single applicant is preferred, such as Imperial's IP team. One owner renders it straightforward to transfer the patent to a spinout company at a later date, whereas adjusting to the combined demands of multiple owners may interfere or slow down the process.

8. The Choice of Protection

Professor Salvador Ventura, expert in functional prions, amyloids, and protein aggregation, offered an assessment of what material or function might be patentable for our project. In his view, the hydrogel material at the core of reGELerate was not necessarily novel or patentable. That held even with caveats such as new HET-s constructs and specific cross-linking methods such as the PEG-biotin click chemistry utilised. Incremental changes to a known material often fail the inventive step described earlier (Section 3). Rather than the material itself, Professor Ventura suggested to focus our IP and marketing efforts on our applications. He specifically singled out our use of Sortase A as the genuinely new element, since it has not been done prior in the field. The lesson to be drawn here for future teams is to first approach a domain expert about where the real novelty lies before spending money on an attorney. The most patentable part of a project may not always be the part the team is proudest of, and may be a novel use, combination or method rather than the core biological component.

9. Open or owned: the Tradeoff

The attorney and Imperial's IP team all pointed in the same direction: to protect the idea as soon as possible, as a filing made before the Wiki goes live would preserve every future option, including the possibility of creating a spinout. Once the details are made public, this door cannot be reopened. However, Mr. Hagemann drew on his experience as a founder and advised to keep as much of the idea open as possible rather than requiring an NDA for every detailed conversation: openness allows a team to obtain advice freely, which accelerates ideation and troubleshooting. Although the patent route on disclosed details will be lost, a ten-week summer, this speed can act as a determinant of whether a project works at all. Indeed, his own team's IP work came years after his participation in their iGEM project. Mr. Hagemann also suggested the building of patent families around what has been published on the iGEM wiki. With Puraffinity, he shared that he placed a bet by disclosing the core of the project, making the following assumptions: 1) The value of their future work being much greater, 2) The disclosed core grows a field around their work, establishing more validated tools and methods for further development, and 3) Seeking value in concrete applications, rather than the core technology. All three of those points personally resonated well with our project, steering us away from filing for a patent-pending status.

We have provided a list of useful questions for a team to ask themselves when considering this tradeoff:

- Is there a specific novel element worth protecting, or is the value of the invention mainly in know-how and execution?

- Does any team member genuinely intend to commercialise the invention after the iGEM competition?
- Can the team afford the first filing, and who would pay?
- How much does the team depend on seeking outside advisors to verify technical details?
- Could one element of the project remain confidential whilst sharing the rest?

10. Building a Business Model

We expanded our IP discussion with Dr. Amritpal Singh, who recommended building a licensable royalty business model. Under this framework, a team would hold the rights to their invention but grant others permission to use it in exchange for a fee or a share of their revenue. This offers a middle ground between the two positions discussed in Section 8, leaving room for open science, such as free licenses for academic research, whilst protecting commercial interests where relevant. This perspective further links back to Dr. Cumming's advice on breadth, as the broader the claims, the more downstream improvements others would need to make to license from a team. Therefore, the question of filing for a patent and design of a business model is one that goes hand-in-hand, as revenue stems from deciding what is worth and can be protected.

11. reGELerate's IP Choices

After much deliberation, our team made the decision not to file for a patent. As we started looking into the IP process in April 2026, we had the option to enter a 'patent-pending' stage prior to the Wiki going live. However, we chose to postpone this beyond the scope of iGEM for two reasons: 1) Obtaining advice would have become difficult, as keeping our science confidential would have required NDAs from many advisors and slowed the support that we relied on, and 2) A first filing cost of £8,000-£10,000 was not realistic for our budget. Although this cost could be covered by Imperial's Tech Transfer Office, this would have come with conditions under Imperial's IP policy. Nonetheless, our journey reinforced the importance of records of physical and electronic individual contributions as evidence of inventorship, which were also key in filling out the iGEM Attributions Form. We also created an NDA template that was initially signed by our advisors, which is provided below and can be adapted by any iGEM team considering a spinout. Lastly, one of our team members has since begun exploring a career in IP law.

12. IP Checklist for iGEM Teams

	Start signed, dated physical and electronic notebooks recording who contributed which ideas and which work
	Ask domain expert(s) where the genuine novelty in your project lies
	Contact your university's IP team about ownership rules and any student exemptions, and read their IP policy.
	Book an IP clinic session to discuss IP law with a patent attorney
	As a team, decide where a patent will be filed, which elements will be confidential or whether the invention will remain open

	If filing a patent, obtain signed NDAs before technical discussions
	Hold back sharing project details in Wiki, Parts Registry, Grand Jamboree and other conferences until any filing is made
	Note important deadlines that follow the filing priority date
	Think about the business model, such as licensing, that would accompany the IP decision

ADD NDA TEMPLATE TO WIKI FOLLOWING THIS GUIDE