

Priority certificates: a proposal for non-intrusive forms of IP

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The need for non-intrusive forms of intellectual property

About a decade ago, in an open letter to the Director General of the World Intellectual Property Organization, an international group of 59 top scientists, economists and scholars pointed to the importance to society of the emerging open collaborative projects, implicitly highlighting the need for forms of intellectual property which do not have some of the negative effects associated with present forms of IP such as patents.¹

While patent, copyright and other forms of IP unquestionably bring important benefits to society, there are significant negative side effects due to the economic monopoly privileges granted by IP forms such as patents and copyrights. As the Supreme Court of the United States has recognized, a patent is the grant of a privilege of exacting tolls from the public.² As a consequence, in some circumstances, patents may intrude upon the economic freedom of the public and affect a wide range of economic activities.³ Thus there is a need for forms of IP that bring society benefits such as those associated with the existing forms of IP, including patents and copyright, but do not intrude upon personal and economic freedom and do not have the negative effects of patents and copyrights.

This article presents novel forms of IP (ie priority certificates) which are non-intrusive with respect to economic and personal rights and do not have the negative side effects of monopoly-type property rights. Further, as we explain, these novel forms of IP are suitable for protecting subject matter which is not currently covered by any form of IP, such as scientific discoveries and abstract ideas.

The need for new forms of IP to protect abstract ideas and scientific discoveries

Scientific discoveries, abstract ideas, and laws of nature are not protected as intellectual property.⁴ As recognized

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1 Open Letter to WIPO (2003) 424 *Nature* 118.

2 See eg *A & P Tea Co v Supermarket Corp*, 340 US 147 (1950).

3 Over the past few decades, sometimes unfairly, the media has frequently pointed to the negative side effects that patents may bring upon various

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This article

- A new and non-intrusive form of IP is proposed—the priority certificate—covering unprotected subject matter such as scientific discoveries and abstract ideas. In settings such as the academia, R&D and the arts, it is important to ascertain and formally acknowledge the person entitled to priority with respect to a given discovery or abstract idea.
- A priority certificate is a document attesting and formally acknowledging that the person named in such certificate is the first to discover a certain phenomenon, the first proponent of an abstract idea or theory, etc. A private party, such as a university, may grant priority certificates to parties making claims of priority. Upon examining an application submitted by a claimant, the grantor issues a priority certificate stating that claimant is the first discoverer, creator or author of the claimed subject matter. This way, the priority certificates confer upon the claimant formal recognition and prestige.
- Priority certificates do not confer any exclusive economic rights (eg to sell or manufacture a product). Consequently, they do not create a monopoly and do not have the negative side effects associated with monopolies. They may be implemented by private parties (eg universities) via existing laws, such as contract law, without the need for new legislation or government action. The public can freely use any idea or discovery claimed in a priority-certificate.

sections of society and to the abuse of the patent system by various parties, such as the patent trolls. See eg R Feldman 'Slowing The Patent Trolls' *The New York Times* (28 March 2014).

4 See eg *Diamond, Commissioner of Patents and Trademarks v Chakrabarty*, 447 US 303 (1980).

by Justice Breyer of the United States Supreme Court, the justification for this fact 'does not lie in any claim that laws of nature are obvious or their discovery is easy, or that they are not useful. To the contrary research in such matters may be costly and time consuming . . . and that research may prove of great benefit to the human race.'⁵ The reason for excluding discoveries, ideas and laws of nature from patent protection has to do with the enormous potential for rent seeking that would be created if property rights could be obtained in such subject matter.⁶

Presently there is no clear, formal or uniform procedure for determining and formally recognizing the actual first person who discovered a phenomenon, the first proponent of an abstract idea, the original creator of a theory or explanation, the original proponent of a law or legal argument, the original proponent of an accounting procedure etc. As a result, often no proper credit is given to the actual person who first discovered a phenomenon or to the actual proponent of an idea.⁷ Especially in settings such as academic and R&D institutions, it is important to identify, and formally acknowledge, the parties deserving credit for having first made a specific discovery or for having first proposed a specific idea.

Thus, it would be useful if scientists, authors and innovators would have a uniform, formal and recognizable way of showing that they are entitled to priority and recognition with respect to their discoveries and ideas.

Formal recognition and prestige: some less recognized benefits that invention patents bring to inventors

In our quest to design non-intrusive forms of IP, we start by analysing the benefits that patents bring to inventors, research institutions and society. We identify two types of benefits that patents can convey to inventors and research institutions. First, the most recognizable and important benefits associated with patents are economic in nature and come from the right of the patent owners to exclude others from making, using or selling a patented product, method or composition of matter.⁸ Another

less frequently mentioned benefit is the formal recognition and prestige that invention patents bring to scientists and engineers as inventors.

Patents are formal proof of the inventor's scientific and intellectual achievements. They are valuable resume items and are indicative of technical competence and creativity. More specifically, patents represent a formal recognition that the inventor is the first to file an application for patent for the devices, methods or compositions of matter claimed in his or her inventions (in many instances the person who first files the application is also the first to conceive the invention). In turn, such formal recognition brings prestige and indirect financial gain in the form of employment opportunities, increased salary, government grants, contracts, tenure etc. Significantly, most inventors (ie about 90 per cent of inventors) are employed under assignment agreements transferring to their employer the right to enforce their patents.⁹ It can be argued that, for the inventors bound by assignment agreements with their employers, the primary benefit such inventors receive from their patents consists of the formal recognition and prestige brought by their invention patents.

This prestige and formal recognition extends to employers of the inventors (eg R&D institutions), investors and research funding organizations. In proposals requesting government grants and contracts, R&D institutions often point to the number of patents received by their employees as a proof of scientific and technical achievement.

We note that most negative side effects of the invention patents, such as the intrusion upon economic and personal freedoms, are associated with the economic monopoly privileges conferred by patents and not with the formal recognition and prestige.

Guided by the above observations, we set out to design forms of IP conferring to their holders formal recognition free of monopoly-type rights. Such IP forms would be non-intrusive or less intrusive upon the personal and economic freedoms of the public since they do not confer any exclusive economic rights (ie the right to exclude others from making, using or selling patented subject matter). More specifically, we propose a new

5 *Laboratory Corp of America Holdings v Metabolite Laboratories Inc*, 548 US 124 (2006).

6 *Ibid*, citing W Landes and R Posner, *The Economic Structure of Intellectual Property Law* (Harvard University Press 2003) 305.

7 The history of science is replete with stories and examples where proper credit has not been given to the person who deserves such credit. A famous example concerns the discovery of electron's spin which is a fundamental property of the matter. In the spring of 1925, a young German-American physicist, Edward Kronig, proposed for the first time the notion of spin in his quest to interpret what, at that time, physicist called 'the fourth quantum number'. Kronig arranged a meeting with Wolfgang Pauli and explained to him the idea of spin. Pauli did not recognize at that moment the value of Kronig's idea, and Kronig, who at that time was young and

unknown, failed to publish his findings. A year later, Goudshmit and Uhlenbeck proposed the spin independently of Kronig and successfully promoted their ideas such that the scientific community accepted the notion of spin and acknowledged Goudshmit and Uhlenbeck as the discoverers and first proponents of the spin. See eg M Kumar, *Quantum: Einstein, Bohr and the great debate about the nature of reality* (WW Norton & Company Inc 2008) 173–76.

8 See 35 USC s 271(a).

9 An estimated 90 per cent of patent applications are by inventors who are under an obligation of assignment with their employers and therefore do not own the patents for their inventions. See eg O Lobel 'My Ideas, My Boss's Property', *The New York Times* (13 April 2014).

non-intrusive form of IP for protecting abstract ideas and scientific discoveries as explained below.

‘Priority certificates’

The priority-certificate system in a nutshell

We propose a system for formally acknowledging priority with respect to discoveries and ideas by granting certificates attesting that a person is entitled to priority with respect to a certain subject matter. A priority certificate is a document attesting and formally acknowledging that the person named in such certificate is the first to discover a certain phenomenon, the first proponent of an abstract idea or theory, the first proponent of a solution to a problem, the first to provide an explanation, the first to find a mathematical theorem or proof etc. A private party (eg a university, R&D institution) may establish itself as a grantor of priority certificates by granting such certificates to parties making claims of priority in applications submitted to the grantor. A person who makes a new and useful discovery is entitled to receive such a priority certificate for that specific discovery. A system similar to the patent system can be implemented to support the granting of priority certificates. Upon examining an application submitted by a claimant and finding that the priority-claims are valid, the grantor issues a priority certificate stating that claimant is the first discoverer, creator or author of the claimed subject matter. This way, the priority certificates confer formal recognition and prestige upon the claimant.

Priority certificates confer prestige and formal recognition but do not confer any exclusive economic rights (eg to use, sell or manufacture a product). Consequently, priority certificates do not create a monopoly, do not have the negative side effects associated with monopolies and are significantly less intrusive upon personal rights than invention patents. Priority-certificate systems may be implemented by private parties (eg universities, R&D institutions, tech companies) under existing laws, such as contract law, without the need for new legislation or government action. The public can freely use any idea or discovery claimed or disclosed in a priority certificate.

Priority certificates can bring important benefits to their recipients. Priority certificates may be used as documents officially and formally recognizing that recipients have achieved the priority recited by the claims. This way, a recipient gains the recognition of the scientific community as the person who first discovered a phenomenon, the original proponent of an idea, the creator

of a theory etc. Such formal recognition may, in turn, bring financial benefits via research grants, employment opportunities, tenure etc.

Detailed description of a priority-certificate system

A private party or a government entity may establish itself as a grantor of priority certificates. A person may submit to the grantor, via an application, one or more priority claims that the person is the first to discover a phenomenon; the first to discover a naturally occurring composition of matter; the first proponent of an abstract idea or a thesis; the first proponent of an explanation regarding an occurrence; the first to perform a specific measurement or observation; the first proponent of a solution to a problem; the first to perform a specific calculation; the first proponent of a law or legal argument; the first proponent of a business or accounting strategy; the first proponent of a strategy for solving a crisis; the first proponent of a mathematical formula, algorithm or proof; the first to propose a movie plot; or the first to perform a surgical procedure etc. The specific priority-claims may be expressed as “formal claims” similar to the claims concluding invention patents.

Upon receiving an application for a priority certificate, the grantor assigns a filing date to the application and examines the priority claims to find whether such priority claims are true and whether the claimant is entitled to a priority certificate. The grantor establishes, in advance, well-defined criteria that priority claims must satisfy before granting a priority certificate. Further, the grantor establishes well-defined application requirements, application processing procedures, and examination standards.

Such criteria, requirements and procedures may be set by legislation similar to the legislation setting the conditions for patentability and the patent examination procedures of title 35 of the United States Code and title 37 of the Code of Federal Regulations. However, as discussed below, the priority-certificate system may be implemented without new legislation or government action. The criteria, requirements and procedures mentioned above may alternatively be established by contractual stipulation. The grantor may thus be legally bound, whether by legislation or by contractual agreement, to follow the established granting criteria and procedures for processing and examining applications.

An examiner, employed by the grantor, processes each application according to the established examination procedures.¹⁰ The examiner may determine whether the

10 For example, similar to the way a patent examiner processes patent applications according to the procedures set forth in title 37 of the Code of

Federal Regulations and the Manual for Patenting and Examination Procedures (MPEP) published by USPTO.

application satisfies the established application requirements which may be similar to the written description, definiteness and enablement requirements imposed upon patent applications.¹¹ For instance, a requirement may be that the application concludes with one or more 'formal claims' that particularly and distinctly define the discovery and/or ideas that the applicant regards as their discovery or idea. These 'formal claims' may be analogous to the claims concluding invention patents.¹² Further, a priority certificate may specify, with respect to each formal claim, the person or persons who conceived the specific formal claim and a priority-date for each of the formal claims.

The examiner may check whether priority claims satisfy established certificate-granting criteria which may be analogous to the novelty, non-obviousness and subject-matter eligibility requirements imposed upon patent applications.¹³ For instance, a priority claim may be entitled to a priority certificate only if the following criteria are satisfied: the subject matter of the priority claim has not been previously conceived of by another (ie the claimant is the first to conceive of the claimed idea or to discover the claimed discovery), the subject matter is not obvious in view of the prior art, the subject matter claimed is acknowledged by the examiner as scientifically sound, and sufficient evidence exists to support the priority claims. The examination process may include performing prior art searches, considering evidence submitted by applicants, considering evidence submitted by third parties, etc.

Upon finding a priority claim to be valid, the grantor proceeds to grant the claimant a priority certificate which states that the grantor has examined the application and has found that the claimant is the first to conceive of the claimed idea or the first to discover the claimed discovery. If the grantor finds that a claim in an application for a priority certificate does not satisfy the established granting criteria, the grantor will then reject the priority claim and provide the applicant with reasons for the rejection. An appeal and review system similar to those used for invention patents may be employed to provide claimants with the ability to challenge such rejections.

The grantor may provide priority certificates to the claimant, in the form of a diploma, similar to a letters patent

issued by the US Patent Office (USPTO) to inventors.¹⁴ The priority certificate diploma may include a certification statement such as: 'the grantor (eg foundation, university) has examined the application and the prior art and has found that, to the best of the grantor's knowledge, the claimant is the first proponent of the ideas and discoveries claimed in the priority certificate'. Further, the grantor may maintain a website listing publications of the priority certificates.¹⁵ A website publication of all granted priority certificates may offer means by which the authenticity of the priority certificates may be verified.

The grantor may be legally bound, legislatively or contractually, to follow established granting criteria and procedures for processing and examining applications. Consequently, an applicant for priority certificates may be legally entitled, by legislation or contractual stipulations, to a priority certificate if all of the conditions and requirements set forth by the grantor are satisfied.¹⁶ Further, an applicant for a priority certificate is legally entitled to the examination and review processes set forth by the grantor. Applicants may enforce their right to receive a priority certificate in the courts of law similarly to the way applicants for patents may bring civil action against USPTO in federal courts when patent applications are rejected or when contracts are violated.¹⁷

Granting criteria requiring that the subject matter claimed in a priority certificate is novel (eg has not been conceived by another before the claimant) ensure that the recipient of a priority certificate exclusively obtains such a priority certificate from the grantor. The recipient can exclude others from receiving a priority certificate from the grantor by enforcing the granting criteria set forth by the grantor. This way the recipient enforces his or her right to be the only party receiving a priority certificate, from the grantor, for a specific subject matter.

Priority certificates are thus documents formally attesting that their recipients have achieved the priority recited by the claims therein, such as one of: the recipient is the first proponent of a specific legal strategy for reducing healthcare costs, the recipient is the first to discover a specific biological process in cancer cells, the recipient is

11 See eg 35 USC s 112.

12 See 37 CFR 1.75(a) providing: the specification must conclude with a claim particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention or discovery.

13 See eg 35 USC ss 101–3.

14 See 35 USC s 153: 'Patents shall be issued in the name of the United States of America, under the seal of the Patent and Trademark Office, and shall be signed by the Director or have his signature placed thereon and shall be recorded in the Patent and Trademark Office.' See also MPEP s 1309.

15 The way USPTO publishes patents, applications and patent prosecution documents is similar. See Public PAIR system employed by USPTO to allow

access to published inventions and application: USPTO, 'Patent Application Information Retrieval'. Available at <http://portal.uspto.gov/pair/PublicPair> (accessed 2 February 2015).

16 Similarly, an applicant for an invention patent is legally entitled to a patent if the application satisfies all the requirements set forth by title 35 of the US code and title 37 of the Code for Federal Regulations. See 35 USC s 102(a): 'A person shall be entitled to a patent unless—(1) the claimed invention was patented, described in a printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the claimed invention . . .'

17 35 USC s 145.

the first to discover an atmospheric phenomenon etc. The recipient may use the priority certificate as a formal proof of the priority recited by the claims.

The grantor may enable prospective applicants to secure priority over their ideas and discoveries within a short time after the conception of said ideas or discoveries, by offering, for example, the option to file a provisional priority certificate applications similar to the provisional patent applications offered by USPTO, which informally describe inventions.¹⁸ Further, the grantor may offer prospective applicants a way to secure their ideas and discoveries by way of an 'online accessible evidence-holding-docket'¹⁹ where the prospective applicants may open personal priority accounts and upload documents describing, in an informal manner, their ideas and discoveries within a short period of time (eg even within minutes) from conceiving the ideas or making the discoveries. The uploaded documents may be time-stamped and kept securely and confidentially in the applicant's online account. This way, prospective applicants secure proof of idea conception and discovery as early as the date and time noted by the time stamp. After securing a conception date for the ideas or discoveries, the prospective applicant can formally prepare an application in compliance with the application requirements (which includes, eg, claims,

declarations etc). The informal documents stored on the docket may be considered as evidence to support the priority claims filed in a fully compliant application.

Priority certificates cover a broad range of subject matter in virtually all intellectual fields

Priority certificates may cover a broad range of ideas, discoveries and intellectual achievements in virtually all intellectual fields, such as medically and biologically related fields,²⁰ physics and astronomy,²¹ earth and atmospheric sciences,²² chemistry,²³ environmental sciences,²⁴ anthropology,²⁵ mathematics,²⁶ economics,²⁷ social sciences and public policy,²⁸ diplomacy,²⁹ education and training,³⁰ law,³¹ business, management and accounting,³² arts³³ etc. Consequently, if such a priority-certificate system were well implemented and run, it is likely that a large number of applications for priority certificates would be submitted every year by scientists and innovators all over the world.

Priority certificates can bring important benefits to recipients, to research institutions and to society

Recipients may use priority certificates as formal proof that they have achieved the priority recited by the claims.

18 Filing a fully compliant patent application may require long time and may be costly. The provisional patent application was introduced in 1994 to allow inventors to file an informal description of their invention, via a provisional applications to thereby secure an earlier filing date. See 35 USC s 111(b).

19 Gelu Comanescu, Susan Pan and Quadeer A Ahmed 'Encouraging the Exchange and Disclosure of Ideas by Providing Reliable and Easily Accessible Ways of Determining the Actual Inventors and Authors', *IP Today* (March 2014).

20 In medical and biological fields, a priority certificate may attest that a person is the first to discover a certain structure inside the nucleus of a certain type cell, the first to discover that a certain protein controls absorption of potassium in the cells, the first to discover that a disease is due to deficiency of a vitamin A, the first to discover a communication mechanism between cells, the first proponent of a specific theory explaining multiplication of cancer cells, the first to discover that a disease is correlated with a certain genetic mutation, the first to discover a certain mechanism associated with cancer cells death, the first to discover a phenomena associated with DNA replication etc.

21 In physics and astronomy, a priority certificate may attest that a person is the first to measure the mass of a fundamental particle, the first to discover a new type of galactic pulsars, the first to observe and photograph a galaxy, the rings of a certain planet, or a black hole, the first to calculate a constant associated with the Big Bang, the first to predict super-conductivity in a certain material, the first to calculate the reaction time in nuclear fission etc.

22 In the earth and atmospheric sciences, a priority certificate may attest that a person is the first to discover stratospheric ozone depletion, the first proponent of a specific theory explaining formation of tornadoes, the first to explain global warming cycles, the first to calculate the global increase in atmospheric temperature etc.

23 In chemistry and materials science, a priority certificate may attest that a person is the first to discover a cubic crystalline phase of silicon etc.

24 In ecology, a priority certificate may attest that a person is the first proponent of the thesis that fertilizers are responsible for the global decrease in bee population, etc.

25 In anthropology, a priority certificate may attest that a person is the first proponent of the thesis that life first appeared in hot springs etc.

26 In mathematics, a priority certificate may attest that a person is the first to find a solution to a problem, the first to propose a strategy for solving a certain system of differential equations, the first to find a proof of a theorem etc.

27 In economics, a priority certificate may attest that a person is the first proponent of a specific theory for evaluating the effects of increasing minimum wage, the first proponent of a specific theory explaining the subprime mortgage market collapse, the first proponent of a specific law or legal frame for stimulating economic growth etc.

28 In social sciences and public policy, a priority certificate may attest that a person is the first proponent of a certain strategy for reducing homelessness, the first proponent of a specific psychotherapy method.

29 In diplomacy, a priority certificate may attest that a person is the first proponent of a solution to an international political crisis.

30 In education and training, a priority certificate may attest that a person is the first proponent of a specific education or training method, or the first proponent of a specific dog-training method.

31 In the legal field, a priority certificate may attest that a person is the first proponent of a certain legal argument, the first proponent of a litigation strategy, the first proponent of a law for improving efficiency at the Patent Office, the first proponent of a specific law or legal frame for lowering healthcare costs.

32 In the business, management and accounting fields, a priority certificate may attest that a person is the first proponent of a business/accounting/management strategy or procedure.

33 In the arts, a priority certificate may attest that a person is the first proponent of an idea for a movie plot, a choreographic sequence of movements, a book plot, a cartoon character, an idea for a painting or a sculpture, etc.

Such formal proof may demand the recognition and prestige of the scientific community, which may in turn bring financial benefits, such as research grants, employment opportunities, increased salary, contracts, tenure etc. Priority certificates would be important items on a scientist's resume by indicating scientific competence and creativity. Moreover, priority certificates would carry formal proof of the scientific and intellectual achievement of their recipients.

Institutions such as tech companies and universities may use the priority certificates, such as those whose claims were conceived of by their employees, as proof of scientific, technical and intellectual achievement. For example, a research university may point to a priority certificate, received by its students or researchers, to show that a scientific discovery has been made in its laboratories; a non-profit organization may point to a priority certificate received by one of its interns or employees to show that an idea or strategy for solving a social problem originated within the organization; an R&D private or government laboratory may point to a priority certificate received by one of its scientists to show that an idea regarding a new green energy source originated within their laboratory, etc. Such formal recognition may bring institutional prestige which, in turn, may bring financial benefits by way of research grants, contracts, better university rankings, more clients, etc.

The amount of government research funds and contracts awarded to R&D institutions and technology companies is without question very large.³⁴ Institutions, such as tech companies and universities, may more fairly secure research funds and contracts by presenting priority certificates to the contracting agencies to show that the institution has a history of innovation. Consequently, the bidding process for government grants and contracts would become fairer and more efficient.

Society will also benefit significantly from implementing a system that awards priority certificates. As explained earlier, there is presently no clear, formal or uniform procedure for identifying and formally recognizing a person who has first discovered a phenomenon, the first proponent of an abstract idea, the original creator of a theory or explanation, the original proponent of a law or legal argument, the original proponent of an accounting procedure etc. As a result, often no formal credit is given to the person who first discovered a phenomenon or to the actual proponent of an idea. This article will present a

number of detailed typical circumstances in which credit is not given to persons deserving such credit, for example, the case of less influential employees of research institutions; the case of independent innovators; and the case of temporary or less influential employees of government agencies.

Failure to provide proper credit for achievements has numerous negative consequences that have a negative social impact. Such negative impact translates into decreased economic productivity, lowered standards of living, decreased number of people involved in scientific and creative fields and the depreciation of trust in the values of a merit based society.

Priority certificates are primarily 'about giving credit where the credit is due'. The priority-certificate system may help scientists and innovators to receive deserved credit and recognition by providing a clear and uniform procedure for securing priority to the recognition for such discoveries and ideas, by way of a priority certificate issued by an authorized impartial party. Further, the priority-certificate system helps institutions (eg universities, research companies, organizations) to receive the deserved credit and recognition for ideas and discoveries resulting from research performed by such institutions. This article will explain how scientists and innovators could use the priority-certificate system, including personal priority accounts implemented via an evidence-holding docket, to secure deserved credit and recognition.

Society draws important economic benefits from an environment where credit is given to the actual discoverers, creators and authors of scientific and intellectual achievements. A priority-certificate system may significantly improve the assignment of merit in research institutions and the society, society will be the ultimate beneficiary of the improved determination of merit, the integrity and the fairness brought by priority certificates to the research and creative environments.

Priority certificates are less intrusive, have fewer negative side effects than other forms of IP

The public could freely use any idea or discovery claimed or disclosed in a priority certificate. Priority certificates are about giving credit where credit is due and do not exclude others from economic activities. Unlike patents and copyrights, priority certificates do not confer any economic right, such as the right to exclude others from

34 The Government pays an estimated US\$320 billion every year in contracts. See eg R Nixon, 'Government Pays More in Contracts, Study Finds', *The New York Times* (12 September 2011), citing Project of Government Oversight, <http://www.pogo.org/>. The Federal Government is estimated to spend about US\$40 billion a year in direct R&D activities. This sum does

not include indirect investments by contracts with technology companies which are using the proceeds of the contracts to perform research and development. See eg '2014 Global R&D Funding Forecast' <http://www.battelle.org/media/press-releases/2014-global-funding-forecast> (8 February 2015).

using, selling or manufacturing a product. Thus a priority-certificate system is significantly less intrusive upon personal and economic rights than the invention patents system, and priority certificates do not have the negative marketplace side effects associated with monopolies.

Priority certificates constitute intellectual property

The question arises as to whether a grant of a priority certificate with no intrusive economic right can reasonably be termed a right that falls within the ambit of the term ‘intellectual property rights’. The answer to this question is resoundingly in the affirmative, because the right of a person to be the first inventor or the first conceiver conveys a degree of exclusivity vis-à-vis the rest of the world. The notion of property is inseparable from the notion of exclusivity. A priority certificate is, by definition, issued with respect to intellectual developments only. Thus, even though priority certificates are non-intrusive in terms of economic monopoly, they certainly constitute intellectual property.

Government as grantor of priority certificates: not advised

A government entity similar to the USPTO may be established as a grantor of priority certificates and as the administrator of the processing and the examination of applications for priority certificates. The government entity may set up a priority-certificate system like that previously described. The priority certificate granting criteria and the application processing procedures may be implemented via legislation. Such supporting legislation may parallel laws regulating invention patents such as title 35 of the United States Code. For example, a law analogous to 35 USC s101 may establish the right to receive a priority certificate as follows: ‘whoever makes any new and useful discovery or conceives a new and useful idea, thesis or theory is entitled to obtain a priority certificate subject to the conditions and requirements of this title’. Various countries may implement their own priority-certificate systems in a similar way that they implement their own patent systems. Thus multiple priority-certificate systems may co-exist and may separately provide a means to secure formal recognition for discoveries and ideas.

35 Unilateral contractual offers are offers that can only be accepted by performance. An example of unilateral offer is a reward offer such as an offer published in a newspaper advertisement offering a reward (eg money, employment) to whoever performs the action recited by the offer, such as: ‘I offer \$1000 to whoever brings my car from New York to Los Angeles’. Any member of the public is an offeree of a reward offer. See eg E Allan

A priority-certificate system implemented by a government has the advantage of lending the government’s authority and credibility to such a service and to any issued certificates. However, a government-implemented priority-certificate system presently has shortcomings. For example, it may take decades to implement such a system and to enact supporting legislation. This article does not further address the issue of priority certificates by a government and assumes that priority certificates are issued by a private party, as explained below.

Private party as grantor of priority certificates: preferred

Implementation via contract law: no need for any government action or new legislation

Unlike monopoly-type IPs, there is no need for government action or legislation to implement and operate a priority-certificate system as that described here. In the case of patents, government legislation is necessary to enforce the right to exclude others from making, selling or using a patented product; however, priority certificates do not confer rights to exclude others and, therefore, government action is not necessary to implement a priority-certificate system.

A private party of significant stature and scientific credibility, such as a major university or a major tech-company, may establish itself as grantor and take on the task of implementing a priority-certificate system. The private party may legally bind itself, by a reward or unilateral contractual offer, to grant priority certificates to any applicant that satisfies the conditions and requirements set forth by the terms of the unilateral contractual offer.³⁵ For example, the private party may publish, in a newspaper or on a website, a unilateral contractual offer paralleling 35 USC s 101³⁶ as follows:

[T]he offeror (eg a specific university or institution) promises to grant a priority certificate to whoever makes any new and useful discovery or conceives any new and useful idea, thesis or theory subject to the terms and conditions hereinafter.

The terms and conditions for granting priority certificates may be set by contractual stipulations. For example, a novelty requirement for the discovery or idea may be

Farnsworth et al, *Contracts Cases and Materials* (6th edn Foundation Press 2001) 32 and 67.

36 35 USC s 101: ‘whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title’.

written in the terms and conditions, as a contractual stipulation, to parallel 35 USC s102(a)(1)³⁷ as follows:

[A] person shall be entitled to a priority certificate unless the claimed idea or discovery was described in a priority certificate, in a printed publication, or in public use, or otherwise available to the public before the effective filing date of the priority claim.

The unilateral offer may be made by means such as publishing the unilateral offer by newspaper advertising, maintaining a website accessible to the public where the unilateral offer is published, etc. The promise of an offer may create an entitlement in the sense that an applicant for a priority certificate is entitled to receive a priority certificate once the applicant satisfies the terms and conditions of the offer.

The grantor receives, processes and examines applications as described with respect to the priority-certificate system presented in this article. Upon finding that a priority claim in an application is true, the private party would grant a priority certificate to the claimant, stating that grantor has examined the application and has found that claimant is the first to conceive the claimed idea or the first to discover the claimed discovery. The priority certificate may take the form of a diploma issued by the private party and bearing the name and seal of the grantor (eg specific university, consortium of universities, major tech company). As specified above, an applicant could use such a priority certificate as proof of technical, scientific and intellectual achievement.

Since the grantor and applicant may be bound by a contractual agreement, any controversies appearing between the parties may be solved in a court of law, according to the terms of the contract.

Who can be a grantor: the question of multiple grantors

Multiple parties may implement and run independent competing priority-certificate systems. In principle, anyone may establish and run a priority-certificate system. However, implementing and running a functional priority-certificate system is likely to be a massive project involving significant intellectual and logistic challenges that only parties of considerable size and stature could afford. Further, only parties recognized by the public as institutions of scientific authority and credibility are likely to run a successful priority-certificate system as explained in the following.

The value of a priority certificate is highly dependent upon the credibility and authority of the grantor. In other words, a priority certificate issued by a grantor that has no credibility or authority in the scientific community is unlikely to confer the formal recognition and prestige desired by its holder. As a result, parties recognized by the public as institutions of scientific authority and credibility are more likely to run a successful priority-certificate system. For example, consider a situation in which two competing parties are each implementing their own priority-certificate system. The first party is a prestigious university, or consortium of universities, having highly ranked academic departments, employing world renowned experts in a wide range of academic fields and being internationally recognized as an institution of considerable scientific authority and credibility. The second party is a small and unknown institution (eg college, corporation, foundation) not recognized in the scientific community as an institution of significant scientific authority. A priority certificate issued by the prestigious university and bearing the name of that university may have significantly more value than the priority certificate issued by a little known institution.

Since the priority certificate issued by a little known institution would not likely bring the desired formal recognition of the scientific community, innovators would have little incentive to obtain priority certificates from the little known institution. Consequently, it is unlikely that the little known institution could implement a successful priority-certificate system.

It is possible and quite likely that multiple priority-certificate systems and granting authorities may co-exists and compete with each other. To help understand the consequences of having multiple granting authorities, it is worth noting that there are well over one hundred co-existing patent-granting systems in the world, implemented by various countries. Further, patents issued by any of these co-existing countries and granting authorities bring recognition and prestige to their inventors, notwithstanding the vast number of patent-granting authorities.

On the other hand, patent-granting authorities having a reputation for performing competent and fair examinations are more likely to carry weight with respect to at least their ability to bring recognition and prestige. Also, patents granted by countries having a reputation as scientific and technological leaders are more likely to carry weight with respect to at least their ability to bring recognition and prestige.

Thus we anticipate that multiple competing priority-certificate systems, implemented by multiple grantors,

37 35 USC s 102(a)(1): quoted above, n 16.

may co-exist and properly fulfil their function to provide scientists and creators with a means of securing formal recognition for discoveries and ideas. Different grantors may implement different priority certification systems addressing different needs of the public. For instance, one grantor may implement an examination system resembling the current American patent systems, another grantor may implement a registration system,³⁸ yet another grantor may implement a system resembling the Japanese patent system in which applications for priority certificates are laid open for public inspection and examination of applications is performed only upon request by an applicant.³⁹

No matter what granting system a grantor chooses to implement, the grantor has a strong interest to implement a fair, competent and reliable priority-certificate system (ie perform good faith determinations of whether a claimant is the first to conceive the claimed subject matter). The value of the priority certificates issued by a grantor may critically depend on the public's perception of the grantor's integrity, credibility and competence. For example, a grantor running an unfair and unreliable system may lose public credibility and, as a result, the priority certificates issued by the grantor will lose value. In turn, the grantor will lose clients (ie applicants). Reputation and public trust are crucial assets to the grantor and, once lost, they may be difficult to recover. Competition between various priority-certificate systems and the market is likely to lead to the survival of only the fairest, most reliable and authoritative priority-certificates-granting systems.

As in the case of patents, for a wide majority of claimed ideas and discoveries, having multiple grantors does not necessarily imply that multiple priority certificates will be issued for the same ideas and discoveries. For patents, applications published in one country are considered as possible prior art by other countries. For instance, assume that a first inventor files an application for patent with the Japanese Patent Office (JPO) and the application is published on a certain date. A few months later, a second inventor files an application in the United States claiming the same invention that was claimed by the first inventor in Japan. The USPTO will then consider the published Japanese application as prior art when examining the application of the second inventor and will reject the second application because the published Japanese application already disclosed the claimed invention. Thus only the first inventor can receive an invention patent.⁴⁰

A similar scenario is likely to play for priority certificates. Assume that a scientist is the first to file a priority-certificate application with a first grantor, claiming priority to a certain idea, and the grantor publishes the idea on its website. A few months later, a second scientist files a priority certificate application, with a second grantor, claiming priority to the same idea. The second grantor will reject the application of the second scientist because the claimed idea has been disclosed, prior to the filing of the second application, in the application filed by the first scientist and published by the first grantor. As explained above, grantors have a strong interest in determining, in good faith, whether a claimant is indeed the first to conceive of the ideas claimed in the application and to reject priority claims on subject matter conceived by others before the claimant. Thus, for the wide majority of ideas and discoveries that may be claimed in applications for priority certificates, the existence of multiple grantors does not necessarily imply that multiple priority certificates will be issued for the same ideas and discoveries.

Further, if a grantor finds out that a priority certificate has been improperly granted (eg because another grantor has issued a priority certificate for the same idea to another person), the grantor can withdraw the priority certificate. Withdrawal of a priority certificate may be performed, for example, by attaching a note to a priority certificate published online, stating that the specific priority certificate has been withdrawn. Such features can further reduce the probability that different parties may obtain priority certificates for the same idea or discovery.

Independence of the grantor will likely be one of the factors that contribute to the reputation of the grantor for fairness. In the situation in which a university becomes a grantor, for example, the question arises as to whether subject matter developed by that university should be disqualified from consideration for priority certificates from the grantor. On the one hand, disqualification in this manner would avoid claims of bias. On the other hand, disqualification of subject matter developed 'at home' by the university would make it unlikely that the university would take the initiative to become a grantor at all. The answer to this dilemma resides in the founding of the grantor as an organization that is part of the university but independent of direct control or coercion by the university's board/management. Various mechanisms can certainly be put in place to reasonably protect the fairness of the granting process from undue influence by the hosting institution.

38 MA Lemley 'Rational Ignorance at the Patent Office' (2001) 95 *NWU L Rev* 1495; FS Kieff 'The Case for Registering Patents and the Law and Economics of Present Patent-Obtaining Rules' (2003) 45 *Boston College L Rev* 55 (2003).

39 See eg Thomson Reuters, Intellectual Property and Science, 'Patent FAQs: The Japanese Patenting System' <http://ip-science.thomsonreuters.com/support/patents/patinf/patentfaqs/jplaw/> (accessed 2 February 2015).

40 35 USC s 102(a): quoted above, n 16.

No need for government involvement: implementing a priority-certificate system is significantly simplified

It is recognized that implementing and running a functional priority certificate system is a major project involving significant intellectual and logistic challenges. Establishing the rules associated with the certificate-granting criteria, the examination standards, and application processing procedures is equivalent to writing the patent laws, regulations and examination procedures from scratch. Similarly, setting up a priority-certificate system is equivalent to building the patent system from scratch. When considering that the current US patent system was built gradually over a period of more than 300 years⁴¹ in which thousands of legal professionals, scholars, patent professionals, economists and scientists have brought their contributions, one gets a glimpse into the significant intellectual and logistic challenges that parties attempting to set-up a priority-certificate system may face.

Nevertheless, the worldwide patent systems offer valuable starting points for parties attempting to design a priority-certificate system. As explained above, many of the substantive and procedural rules of a priority-certificate system may parallel corresponding features of the patent system.

Implementing a priority-certificate system is significantly simplified by the fact that it can be performed by a private party under contract law. In other words, the grantor may freely establish the substantive and procedural rules that regulate the system by drafting the terms and conditions of a unilateral contractual offer. The terms and conditions of the offer can be easily amended according to public feedback and to the unforeseen logistic challenges. Such a priority-certificate system is thus significantly more flexible than a system implemented by a government by legislation, such as the patent system, for which amendments of substantive rules are likely to involve enacting legislation which is a notoriously difficult, capricious and long process.

Technology advances and other developments likely to improve economic feasibility and reliability

The economic feasibility and reliability of a priority-certificate system depends to some extent on the cost and

the quality of the prior art searching and the examination processes. While at this time the cost of prior art searching and examination is still relatively high there are clear trends pointing to a substantial decrease in the costs of prior art searching and examination.⁴² An article recently published by *The New York Times* describes an important and positive trend in the law practice and other white collar fields: the fact that many of the activities that were traditionally performed by highly skilled workers are currently performed by cheaper software.⁴³ Software increasingly makes its way into tasks and activities that once were the exclusive province of human decision-makers such as lawyers, loan officers, accountants, examiners etc.⁴⁴ Patent offices in various countries are implementing new online tools and software performing tasks previously performed by examiners or other qualified personnel.⁴⁵ Various information technology companies are working on creating software helping the office to automatically prosecute applications or even to automatically perform examination of applications.⁴⁶

The process of prior art searching is particularly likely to benefit from such software tools and applications. A significant number of private prior art searching companies offer their services while advertising their algorithms newly developed in-house and implemented via software packages and engines.⁴⁷ The above discussion shows that many activities that may be involved in the granting of priority certificates, such as examination and prior art searching, are likely to be significantly improved (ie lower costs and higher quality) by new software and information technology tools that may appear in the near future. Thus, while at present the searching of prior art and the examination of applications may be still relatively expensive, it is quite likely that future advances in areas such as artificial intelligence, software engineering and computer hardware will significantly decrease the costs and improve the quality of searching and examination.

Further, various features and information technology (IT) tools may be implemented to make the system more efficient and reliable. We mentioned in this article a number of such IT-based features and tools. A particularly useful such tool are the personal priority accounts and the 'online accessible evidence holding docket', briefly

41 EW Hulme, 'The History of the Patent System under the Prerogative and at Common Law' (1896) 46 Law Q Rev 141.

42 A significant number of private prior art search companies advertise their services on websites. The prices for prior art search per patent varies from about US\$500 to about US\$1,000 per patent. See eg the search services provided by the Australia-based Ambergite (see Ambergite 'Automated Patent Searches', www.ambergite.com/index.php/services/reports (accessed 2 February 2015)) and the United States-based Planet-Patent (see PlanetPatent 'Patent Search Types & Price', www.planetpatent.com/patentsearchtypesandprices/ (accessed 2 February 2015)).

43 J Markoff 'Armies of Expensive Lawyers Replaced by Cheaper Software', *The New York Times* (4 March 2011). See http://www.nytimes.com/2011/03/05/science/05legal.html?pagewanted=all&_r=0.

44 *Id.*

45 A Chin, 'Search for Tomorrow: Some Side Effects of Patent Office Automation' (2009) 87 NC L Rev 1617.

46 See eg US patent 7,904,453 for 'Apparatus and method for analyzing patent claim validity' by inventor AI Poltorak.

47 See eg Ambergite and Planet-Patent, above, n 42.

described above, allowing innovators and scientists to secure their ideas within minutes from conception via a personal and confidential internet account provided by the service.⁴⁸ Once the public becomes aware of the existence of an evidence-holding docket service and makes use of it, many of the controversies related to determining the actual authors of a specific idea may be solved. Information technology also makes possible the implementation of an effective tool for correcting granting mistakes—a website publishing a list of all the valid priority certificates. Once the grantor finds out that a priority certificate has been improperly granted, the grantor removes the priority certificate from the list of valid priority certificates, thereby effectively invalidating the certificate. This way, the public can easily check whether a specific priority certificate is valid.

As specified above, the grantor may design a priority-certificate system to parallel features implemented by various patent systems (eg the US patent system, the Japanese patent system, the Canadian patent system). We believe that the costs of priority certificates and the number of wrongfully granted certificates may be significantly decreased if the application for priority certificates are ‘laid open’ for inspection by the public for a period of time before examination, in a process similar to the laying open of patent application by the Japanese patent office. The public will therefore have the opportunity to submit prior art and to challenge priority claims. For example, an applicant for a priority certificate in the field of atmospheric physics will have his or her application laid open for a two-year period. The grantor may publish a list with all the application filed over the last two years in the field of atmospheric physics. During this two-year period, scientists in the field of atmospheric physics may check the list of priority certificates in this particular field and submit comments and evidence relevant to the claims.

Further, the flexibility in drafting the granting criteria and procedures allows grantors to implement with ease various tools and features to improve the efficiency of the priority-certificate system proposed by various IP scholars. For instance, the grantor could implement a hybrid registration-examination system in which the applicant obtains a ‘petty priority certificate’ prior to full examination⁴⁹ or an ‘origination’ system.⁵⁰ The grantor could implement an

auction system in which the grantor auctions examination slots in which prospective applicants may bid for such examination slots.⁵¹ In this way the grantor may efficiently allocate the examination slots and set examination fees, according to factors determined by the market. At the same time, the grantor could implement a small/micro entity fee system, in the spirit of the small-entity status employed by the Patent Office,⁵² where the ‘big guys’, the ‘small entities’ and ‘the micro-entities’ compete on separate pools of slots.⁵³ Such a multi-track bidding system would prevent big companies from bidding against small independent innovators.⁵⁴ Advanced economic and logistic tools, such as game theory, could also be implemented to optimize the priority-certificate system in a similar way as such tools could be used to optimize the patent system.⁵⁵ Parameters and features of the priority-certificate system could be easily changed and adjusted according to feedback received from the public, economic circumstances, grantor’s goals, various socio-economic factors, etc.

We confidently conclude that, in the future, improvements and creative solutions to the various logistic issues associated with the priority-certificate system will be found. While at present the prior art searching and examination of applications may still be relatively expensive, it is quite likely that future advances in areas such as artificial intelligence, software engineering and computer hardware will significantly decrease the costs and improve the quality of searching and examination.

Institutions granting priority certificates will strengthen their reputation and academic authority

Implementing and running a priority-certificate system may bring important benefits to the grantors. Like the processing of patent applications by USPTO, the processing of the priority-certificate applications may be performed for a fee so as to offset the costs associated with implementing and running a priority-certificate system. Further, the institutions administering priority-certificate systems may gain worldwide recognition and prestige as a result of acting as grantors of priority certificates. For example, a university or high-tech company running a priority-certificate system could gain worldwide recognition as the body deciding ‘what is new and

48 Comanescu et al, above, n 19.

49 See Lemley, above, n 38, 45, citing RH Stern, ‘On Defining the Concept of Infringement of Intellectual Property Rights in Algorithms and Other Abstract Computer-Related Ideas’ (1995) 23 AIPLA Q J 401, 519.

50 See Lemley, above, n 38, 45, citing A Bartow, ‘Separating Marketing Innovation from Actual Invention: A Proposal for a New, Improved, Lighter, and Better-Tasting Form of Patent Protection’ (2000) 4 J Sm & Emerging Bus L 1, 16.

51 CJ Katopis, ‘Perfect Happiness? Game Theory as a Tool for Enhancing the Quality of Patents’ (2008) 10 Yale J L & Tech 360.

52 See 37 CFR ss 1.27 and 1.23.

53 See Katopis, above, n 51, 399.

54 Ibid.

55 Ibid.

what is not' in the scientific, intellectual and innovation world. This way, the grantor may strengthen its position as an intellectual, scientific and academic authority over the world.

Notes and specifications

Priority certificates are primarily 'about giving credit where the credit is due'. Society would benefit significantly from implementing a system of awarding priority certificates, as we now explain.

Tools to enable scientists and innovators to secure recognition for discoveries and ideas

Presently there is no formal or uniform procedure for determining and recognizing the actual persons or institutions deserving credit for a specific discovery or idea. As a result, oftentimes, proper credit is not given to the actual first person who discovered a phenomenon or to the actual first proponent of an idea. In the following sections, there are presented three examples in which credit is not properly give to the right person.

The case of less influential scientists employed by research institutions

The first example describes a typical case of young or less influential scientists working in collaborative work environments. A large majority of discoveries and ideas are now made or conceived by scientists and innovators employed by institutions. Scientists and innovators employed by institutions are usually part of a research/work group comprising many other employees. Members of such research groups work together to find solutions to certain problems and towards accomplishing specific goals. In this process, scientists necessarily discuss and inform each other of their ideas, findings and interpretations.

Consider a young and highly motivated scientist working for a major R&D institution employing many experienced and renowned researchers. The young scientist is part of a group that tries to find and understand the mechanisms associated with cancer cell multiplication. After studying the results of various experiments conducted by his co-workers and other research groups over the last five years, the young scientist concludes that, contrary to current scientific belief, a specific protein is critically involved in a certain multiplication

process and that newly identified mechanism is active during multiplication.

Over the next months, the young scientist informs his co-workers, during group meetings and informal discussions, that he thinks the mechanism involving the specific protein takes place during cancer cell multiplication, and he proposes an experiment to confirm the existence of the mechanism. As often happens, his co-workers do not pay much attention to the suggestions of the young, less experienced scientist, especially when such suggestions contradict their own scientific understanding. Over the next six months, ideas in line with the young scientist's findings are increasingly discussed during meetings, and his co-workers decide to perform the experiment that could confirm the hypothesis. However, because of the multiple discussions and exchanges of opinions taking place over a long period of time and the lack of clear records, many of the more influential co-workers may argue that the main ideas started with them and may minimize or ignore the contribution of the young scientist.

The experiment is performed and conclusively confirms that the mechanism proposed by the young scientist indeed takes place. An article is published describing the newly discovered mechanism, listing 12 co-authors: two prestigious research group leaders, two people who prepared the samples, three people who performed the experiments, a person who wrote the data processing code, two students that performed data processing, one statistician and the young scientist.⁵⁶ As is the case in most journal articles, the article does not specify the contribution that each co-author brought to the discovery. Particularly, the article does not specify that the young scientist is the actual person that conceived the most important idea of the article.

In the following months, the scientific community recognizes the discovery as ground-breaking. However, since the article does not specify the contribution of each co-author, credit most likely goes to the organization/research group and to the prestigious researchers (whose names are highly recognizable) at the expense of the less known co-authors such as the young scientist. In fact, if the young scientist's contract ends before the article is submitted for publication, he may not even be named in the article and may not have any reasonable recourse to this situation. The managers and group leaders usually decide who is included as author in the article because they have control over the laboratory, the funds and the

⁵⁶ Most often, articles in science and technology have necessarily many co-authors because of the diverse experimental procedures necessary to a complete study. Each co-author is likely to have a specific type of

contribution to the article. It is not unusual for the articles in science and technology to have more than ten co-authors. See eg below, n 60 for an example of an article having 36 co-authors.

equipment used to perform experiments. Thus the lack of a formal procedure for securing priority and identifying the parties deserving credit for discoveries and ideas, and the lack of a procedure for obtaining formal recognition for such discoveries and ideas, often leads to situations in which credit is not given where it is due.

Existing constraints in present research and academic environments make it very difficult for young scientists to receive the credit they deserve and to protect themselves in situations similar to that described above. For example, there currently exists no realistic option for a young scientist to publish his findings alone, while employed by a research institution or company, because that would likely upset his co-workers and managers and would almost certainly jeopardize his career. Also, in order to confirm the validity of his prediction, the young scientist may need to perform experiments that require a laboratory and expensive equipment which is controlled by the group leaders.⁵⁷ Such impediments are exacerbated by various other circumstances existing in present research environments. For example, many young scientists are often employed for years on a temporary basis as contractors, post-doctoral researchers, fellows etc. In their early career, young scientists are forced to change their workplace quite frequently, and careers of scientists are highly dependent on the letters of recommendation they can obtain from their former group leaders and managers.⁵⁸

The case of independent innovators and outsiders

A second example of a typical situation in which credit is not properly given to the right person involves a scenario of independent innovators, where the innovators find solutions to problems in a field without being employed by an institution that is expected to innovate in that field (ie outsiders to the field). For example, consider a teacher passionate about economic issues, who, after reading a couple of books about the latest financial crisis, conceives a legal frame or mechanism eliminating the conflicts of interest affecting credit-rating agencies. She writes an article describing her idea and sends it to various journals and newspapers. She soon discovers that none of the journals are interested in her article, and most of them do not even answer her emails. After calling some of the editors, she discovers that they do not take her seriously because she is not a professional economist and because she is not associated with any institution expected to innovate in the financial or economics

fields. Further, she contacts various think-tanks and economics departments of various universities, but she is ignored. A couple of years later, an economist employed by a prestigious think-tank publishes a long and detailed article in a highly ranked journal proposing, in essence, the same legal frame as the one conceived by the teacher. The article receives great reviews, the proposed legal frame is discussed at length by major newspapers, and soon the US Congress considers enacting legislation to implement the mechanism originally conceived by the teacher. However, the credit for conceiving the legal frame goes to the economist and the prestigious think-tank and not to the teacher. Thus, once again, credit goes to the established prestigious party and institution at the expense of the unknown party—in this case the independent innovator.

The case of employees of institutions which do not customarily publish in journals

A third example is that of innovators employed by institutions that do not usually publish their discoveries and ideas in journals. For example, consider a young intern working for a government agency on issues related to affordable housing and housing for persons with disabilities. After performing considerable research, the young intern conceives a new procedure for monitoring the needs of persons with disabilities. She informs her supervisor and co-workers about her findings and ideas and proposes starting a programme to implement the procedure. They listen to her and some acknowledge that her idea is 'creative' but do not do much more about it. A couple of months later her internship ends. Another six months later, a brainstorming meeting takes place at the agency in search of solutions to various issues. During the meeting some participants bring up the intern's ideas and, after more meetings and discussions, the leaders of the agency decide to start a programme which essentially implements the ideas proposed by the intern. In the following years, the programme proves to be highly successful. The head of the agency, the director of the programme and other officials are credited as its architects and receive honours, promotions and significant kudos for their creativity and competence. When asked during an interview to name the person who came up with the core idea of the programme, the head of the agency answers that it was the product of collective brain-storming and that there is not a single person who deserves credit but the agency as a whole.

57 The author Gelu Comanescu has worked for more than ten years as physicist in various R&D environments (eg academia, major technology companies, government laboratories). During this time, he has personally witnessed and discussed these situations with many other scientists.

58 Ibid.

The above examples show that, in many situations, scientists and innovators do not receive the credit they deserve for their discoveries and ideas. Such undesirable situations particularly affect less influential, young and independent innovators. It is believed that such undesirable situations are due to the lack of a formal procedure for securing priority and to the lack of a procedure for obtaining formal recognition for such discoveries and ideas. Thus there is a need for tools enabling scientists and innovators to secure the recognition they deserve for their discoveries and ideas.

How priority certificates help scientists and innovators secure credit for their ideas and discoveries

The priority-certificate system may help scientists and innovators to receive deserved credit and recognition for their discoveries and ideas by providing them with a clear and uniform procedure for securing the recognition. This recognition may be provided via a formal document—a priority certificate—issued by a trusted impartial party. We consider that a private-party grantor of priority certificates may run a priority-certificate system in conjunction with an ‘online-accessible evidence-holding-docket’ as described earlier in this article. In the following, the article will describe how scientists and innovators may use the priority-certificate system, with reference to the three examples described above.

Consider the young scientists employed by the major R&D institution who discovered a new type of mechanism taking place during multiplication of cancer cells. Immediately after making the discovery, the young scientist writes, in digital form, an informal description of his findings, conclusions, reasoning, the proposed new mechanism or theory and the experiments that could confirm his theory. Then he opens a password-protected personal priority account via a website of ‘an online-based evidence holding docket’ and uploads the document describing his findings on his account. The administrator of the evidence-holding docket (ie the grantor) keeps the uploaded documents, and the upload time-stamps, securely and confidentially on the scientist’s account and consistently maintains the docket as a standard business record. Upon request, the administrator of the docket testifies and provides certification that the scientist has uploaded the above description on the date shown by the time-stamps. This way, within hours from the discovery or conception, the young scientist secures proof that he has conceived the ideas and made the discoveries described in the document. After that, the scientist may safely inform his co-workers about his findings,

without fearing that his ideas and discoveries will be misappropriated.

Let us assume that the scientist informs his co-workers; the co-workers do not do not pay much attention to him; six months later, they decide to perform the experiment; the experiment is successful; an article with twelve co-authors is published; and the scientific community recognizes the discovery as ground-breaking. In the meantime, the scientist files, with the grantor, an application for priority certificate claiming that (i) he is the first to recognize that cancer cell multiplication must involve the specific protein; (ii) he is the first proponent of the specific multiplication mechanism and (iii) he is the first to propose the experiment that confirmed the mechanism. The informal documents stored on the docket and the corresponding time stamps are considered as evidence supporting the above priority claims or as provisional applications for priority certificate.

A year later, the grantor performs a rigorous examination of the application including prior-art searches, laying the claims open to the public for opposition, considering adverse claims by authors of the article as well as documents and declarations submitted by co-workers, etc. Upon completing the examination, the grantor concludes that the young scientist is indeed entitled to priority with respect to his claims. The grantor issues a priority certificate in the name of the scientists for the three claims. Further, the grantor publishes the priority certificate on a dedicated website so that the public can inspect the certificate and learn about the claimed discoveries and ideas. The young scientist can use the priority certificate as formal proof that he is indeed the first person to make and/or conceive of the claimed ground-breaking discoveries and ideas. The scientist does not need to inform his co-workers or anyone else that he used the docket to secure conception date or that he filed for a priority certificate. He may choose to keep his application unpublished and confidential until he feels comfortable that he can make his claims public.

In a similar fashion, ‘the independent innovator’ of the second example described above can secure her idea via the evidence-holding docket and can obtain a priority certificate attesting that she is ‘the first to propose the claimed legal frame/scheme eliminating conflicts of interest affecting the credit rating agencies’. Even if the prestigious economist publishes an article in a peer-reviewed journal disclosing essentially the same scheme, the independent innovator can use the priority certificate to prove that she was the first to come up with that idea. Faced with the formal proof brought by the priority certificates, the economics community and the media are forced to recognize that the independent innovator

(ie a teacher not affiliated with any major economics institution) was the first to propose the highly acclaimed scheme eliminating conflicts of interest affecting the credit rating agencies. As a result, the teacher may be able to secure employment with a prestigious financial institution or a public policy think-tank.

Similarly, the intern in our third example can secure her idea via the evidence-holding docket and obtain a priority certificate attesting that she is ‘the first to propose the procedure for monitoring the needs of persons with disabilities’. The priority certificate will allow her to provide formal proof that she was the first to propose the highly successful programme. The priority certificate may convince the media, the public, and the officials of the agency that the programme indeed started with her idea.

Thus the priority-certificate system may help scientists and innovators to receive the credit and recognition they deserve for their discoveries and ideas by providing a clear and uniform procedure via a formal document, a priority certificate, issued by a trusted and impartial party. Further, the priority-certificate system may help institutions to receive credit and recognition for ideas conceived and the discoveries made as a result of research performed by such institutions.

The superiority of priority certificates over journal articles in securing priority

Academic journals serve numerous functions of paramount importance to society. One such primary function is to provide a forum where scientists, scholars and innovators disclose ideas, discoveries and studies to their peers and to the public. Journal articles are primarily concerned with informing the scientific community and the public. However, as explained below, journal articles are not designed to specifically determine the actual first discoverers and creators of specific discoveries and ideas. In that sense, priority certificates are designed to ‘fill the gaps’ between the array of functions served by journals.

Obligation to grant a priority certificate

Unlike journal articles, an applicant is legally entitled to receive a priority certificate if he satisfies all the conditions set forth by the grantor. A journal is not legally bound to publish an article submitted by an applicant, even if the article discloses a novel and valuable idea or discovery and the article satisfies all the journal’s requirements (a journal may reject an article for reasons unrelated to whether the article disclose new ideas or discoveries, such as that the article does not fit well with

purpose of the journal, the article does not fit the topic journal, there is no interest in the article, the journal has a monthly publication limit and other received articles are of more interest to the readers, the journal accepts only articles submitted by recipients of graduate degrees⁵⁹). In other words, in response to an author submitting an article to a journal, the journal editor may simply answer that the article is not the right fit for the journal, without any further explanation, and the author has no recourse to editor’s decision.

In contrast, the grantor of a priority certificate may be legally bound to grant a priority certificate to an applicant claiming a new idea or discovery and satisfying the requirements set forth by the grantor. The grantor may not reject an application without providing specific reasons supporting the rejection and without allowing the applicant to challenge the rejections via a review and appeal process (ie a review and appeal processes similar to that employed by the Patent Office). The grantor is legally bound to treat all applications by the same uniform rules and standards. The grantor would be bound by the stipulations in the contractual offer to follow the examination procedures analogous to the ones established by the US Patent Office. For example, a proper rejection of a claim may require that the examiner make a prima facie case that the claim is not entitled to priority (eg by providing the specific contractual stipulation and the reasoning supporting the rejection). Thus an applicant for a priority certificate may be legally entitled, via contractual stipulations, to a priority certificate if all the conditions and requirements set forth by the grantor are satisfied. Factors such as the number of applications received by the grantor and the apparent interest of the public in the claimed idea do not affect whether the applicant receives a priority certificate. Further, applicants may enforce their rights to receive a priority certificate in the courts of law.

Clearly formulated formal claims and evidence supported priority dates for each claim

Unlike journal articles, priority certificates include ‘formal claims’ specifically identifying the claimed new ideas and discoveries and the person that has conceived the ideas and discoveries. Journal articles do not distinctly identify which of the many features, ideas and discoveries disclosed in an article are indeed novel or which of these ideas and discoveries belong to the authors. In other words, journal articles do not include ‘formal claims’ such as the claims concluding an invention patent and a priority certificate. Especially in science and engineering, many

59 For example, the Berkeley Technology Law Journal does not accept articles submitted by JD candidates.

journal articles are authored by tens of authors affiliated with more than one organization.⁶⁰

A specific idea disclosed in an article has often been conceived by only one of the many co-authors. Journal articles identify neither the specific novel ideas disclosed in the articles nor the specific authors, out of all the co-authors, who have conceived of the novel ideas. Because of this, often credit for the ideas and discoveries in an article with many co-authors is improperly given to the most influential or prestigious co-author at the expense of the less influential members of the research group. Factors such as this make it difficult for less influential scientists and innovators to get the credit they deserve for their ideas and discoveries. In contrast, priority certificates may specifically identify the claimed new ideas or discoveries and may also identify the person who conceived the ideas and discoveries.

Establishing priority

Unlike journals, the priority-certificate system is specifically designed to determine whether a claimant is entitled to priority. Traditionally, the first to disclose a discovery or an idea in a journal article is usually credited as the first to make the discovery or the original proponent of the idea. However, journals do not specifically seek to determine the actual first proponent of an idea or the first discoverer of a specific discovery. For example, journals do not perform rigorous prior art searches aimed specifically at finding whether someone else has also conceived the ideas disclosed in the article prior to the authors.

In contrast, a priority-certificate system would be specifically designed to determine whether the claimant of an application for priority certificate is the actual first person to conceive the claimed idea or discovery. To accomplish this, the grantor may perform prior art searches, consider evidence submitted by applicants and third parties, consider third party challenges, etc. Priority-certificate systems may provide a formal procedure aimed specifically at determining whether the claimant is the actual first person to conceive the claimed idea or discovery. Further, a priority certificate distinctly specify, on its face, an evidence supported priority date for each of the claims.

Securing priority and specifying a priority date

Unlike journals, priority certificates are designed to allow authors to secure a priority date for their new ideas and discoveries within short time from conceiving them. Priority certificates specify an evidence supported

priority date for each recited formal claim. Publication of journal articles is the most often mentioned way of securing priority as the first proponent of an idea, the first to make a discovery, etc. However, publishing in journals is not effective at timely securing priority. First, the time between conceiving an idea and publishing an article describing it usually ranges from several months to a few years. Writing a ready-for-publication article requires significant effort, which often involves weeks of work. Further, because of research environment constraints, a large majority of articles published in science journals have multiple authors and, especially for young scientists, most often it is not feasible to publish an article on your own. Thus writing an article often involves collaboration between many co-authors belonging to multiple research groups. Combining the contributions of the various collaborators into one article and having the collaborators agree to a ready-for-submission version of the article may take months. Once the article is submitted to a certain journal it takes additional time, usually a couple of months, for the article to be peer-reviewed. Moreover, the journal may reject the article, for reasons unrelated to the value of the ideas disclosed, further delaying the securing of priority. In conclusion, journal publication is not an efficient way to secure priority of ideas since the time required to secure the ideas may range from several months to years before the ideas are published.

In contrast, as explained above, by using a priority-certificate system employing an online-accessible evidence-holding-docket, a scientist or an author could secure priority for his or her ideas and discoveries within minutes or hours from conception.

Unequivocal statement that author has conceived a new idea or has made a new discovery

Unlike journal articles, priority certificates make a clear and unequivocal statement that the author is the first to conceive a specific subject matter. The claims of the priority certificates always disclose something new (eg a new idea, a new phenomena). Journal articles do not make a clear and unequivocal statement that authors are the first to conceive new subject matter disclosed in the article. Journal articles do not necessarily disclose something new. Priority certificate may include a certification statement (eg printed on the certificate) such as: 'the grantor (eg foundation, university) has examined the application and the prior art and has found that, to the best of grantor's knowledge, the claimant is the first

60 For example, the article A Alonso-Herrero et al 'The Nature of Luminous X-Ray Sources with Mid-Infrared Counterparts' (2004) *Astrophysical J Supplement Series* 154 has 36 authors.

proponent of the ideas and discoveries claimed in the priority certificate’.

Priority certificates are designed to make the same type of statement about their authors as the statement made by invention patents about their inventors. In contrast to journal articles, a patent necessarily discloses something new (eg a new device, a new method or a new composition of matter). Further, the fact that a person is named in a patent as inventor means that the person has contributed to the conception of at least one claimed invention. Priority certificates are designed to provide the same level of specificity and certainty as invention patents: (i) a priority certificate discloses new ideas and discoveries and clearly identifies the new claimed ideas or discoveries by ‘formal claims’ and (ii) a priority certificate clearly identifies the person who conceived each of the claimed ideas. Thus, like invention patents, priority certificates make the following strong statement about a named author: that author is the first to conceive a new idea, this idea being recited by a specific formal claim. In contrast, the statement made by a journal article about a co-author is only that the co-author had some form of contribution to the research disclosed without specifying the contribution (eg may be routine laboratory work). In conclusion, the statements made by invention patents and priority certificates regarding their authors is significantly stronger than those made by journal articles. Because of this, we believe that scientists and innovators would choose to obtain a priority certificate in addition to publication in journals.

Priority certificates and the allocation of merit

Priority certificates help institutions to evaluate the creativity and competence of individual employees and job applicants.⁶¹ As a result, institutions could be able to promote creative employees to positions where their creativity has the highest impact, to allocate resources and research funds efficiently to the most productive research groups, to reward employees more fairly by increased salaries and bonuses, and to hire the most creative and competent job applicants. Thus, it is expected that priority certificates will significantly help institutions to increase efficiency, productivity and overall creative output.

Further, priority certificates may help governments and society in general to better allocate resources. For example, government and research funding agencies will be able to better evaluate grant proposals and contract

bids by evaluating the competence and creativity of the research groups / institutions which have submitted proposals and contract bids. As a result, government and research funding agencies will be able to efficiently allocate resources, research funds and contracts to the most productive research groups and institutions.

In conclusion, we believe that priority certificates will lead to a significant increase in efficiency, productivity and overall creative output at multiple levels of society. The improved allocation of merit may further lead to improved levels of fairness and integrity across a wide spectrum of institutions and societal facets.

Priority certificates likely to outnumber patents

The number of ideas and discoveries worth protecting via priority certificates is likely to be larger than the number of inventions subject to patent applications. The subject matter eligible for invention patents is restricted to the following categories: processes, machines, manufactures or compositions of matter.⁶² The requirement that the subject matter is ‘new’ further limits the above categories to ‘non-naturally occurring’ compositions of matter, processes, machines and manufacture.⁶³ Moreover, the subject matter eligible for invention patents is further restricted to subject matter satisfying the enablement requirement. Thus a patent cannot be obtained for processes, machines and manufacture for which the inventor cannot practise the invention without undue experimentation.⁶⁴ The above limitations are quite restrictive. In the field of ideas and intellectual achievements, a considerable portion of this field includes ideas and achievements that do not qualify as patent eligible subject matter.

As emphasized throughout this article, scientific discoveries and abstract ideas are not eligible for invention patents. The first author, Gelu Comanescu, has worked for more than ten years as physicist in various R&D environments (eg academia, major technology companies, government laboratories) and has noticed that most of the scientific achievements mentioned by scientists fall into the category of scientific discoveries and abstract ideas. In other words, there are significantly more scientific discoveries and abstract ideas for which scientists could and would like to receive proper credit (eg via priority certificates, publication) than inventions for which

61 For example, current research institutions are using the number and the quality of journal articles on a scientist’s resume as yardstick for evaluating employees’ performance and for selecting job applicants. However, as explained above, journal articles do not specify the individual contributions of each of the co-authors, whereas priority certificates do.

62 See 35 USC s 101, quoted above, n 36.

63 See eg *Diamond v Chakrabarty*, 447 US 303 (1980).

64 See eg *Gould v Quigg*, *Commissioner of Patents and Trademarks*, 877 F 2d 1074 (Fed Cir 1987).

the scientists could be entitled to receive an invention patents.

For example, in biology-related fields, a very large number of scientific achievements comes in the form of discoveries of components or structures of cells and micro-organisms, such as the structure of a certain protein, the structure of various organelles inside the cell, the structure of a bacteria or the structure of a virus. Such components and structures are naturally occurring compositions of matter that are not eligible for invention patents.

Another type of scientific achievement in biology-related fields comes as the discovery of processes and phenomena taking place inside cells and micro-organisms, such as transcriptions, energy generation, protein folding, replications, membrane transport and cell communication. The number of components, structures, processes and phenomena associated with biological structures is vast. It is estimated that there are more than 100,000 types of protein in the human body and an equivalent large number of protein conformations and processes involving these proteins.⁶⁵ There are more than 8.7 million animal species in the world and each of these species includes a large number of components and a large number of mechanisms and phenomena associated with such components and species.⁶⁶ These statistics offer a glimpse into the staggering number of biological structures and processes that are likely to be studied and discovered in the future. Consequently, the number of priority certificates that can be granted annually for discoveries of biological structures and processes may be very large. Scientific fields in which the vast majority of achievements do not qualify for invention patents are astronomy and astrophysics. Scientific achievements in astronomy come as discoveries of new galaxies, stars, planets, radiation fields and associated phenomena. Such discoveries are certainly not patentable and, unlike discoveries in fields such as semiconductors or materials physics, they rarely lead to the conception of new devices or processes eligible for invention patents.

As explained above, priority certificates cover a very broad range of subject matter in virtually all intellectual fields. There are a large number of discoveries made and ideas conceived each year for which scientists and innovators would like to receive credit. Thus, when a priority-certificate system becomes available, a very large number of applications is expected to be filed on yearly basis.

Priority certificates and government-mandated rights

Priority certificates are irrelevant to activities involving government-mandated rights such as patents and copyrights. Priority certificates are designed to protect subject matter that is not protected by any form of IP, such as abstract ideas and scientific discoveries. They are thus fundamentally different from patents, copyrights or any other form of IP. The priority-certificate system is implemented by a private party, such as a university or a private business, and not by the government. Thus a fundamental and highly consequential difference between invention patents and priority certificates is that patents are issued by the government, whereas priority certificates may be issued by a private party. Invention patents as government-issued documents bear the full power of the government, whereas priority certificates do not necessarily bear government power, being closer to diplomas granted by private universities and organizations.

It is uncontroverted that one of the most important benefits that invention patents bring to the society consists in creating strong ‘incentives to invest in research and development’.⁶⁷ Such incentives are strictly connected to the right to exclude others from economic activities. As explained above, priority certificates do not confer the right to exclude others from any economic activity. As a result, priority certificates do not bring this most important benefit of invention patents—the strong incentive to invest in research and development.

Summary of advantages

This article has presented a new form of IP, the priority certificate. Priority certificates are suitable to protecting subject matter not protected by existing forms of IP, such as scientific discoveries and abstract ideas. The public may freely use any idea or discovery claimed or disclosed in a priority certificate. Unlike invention patents and copyrights, priority certificates do not confer any economic rights, such as the right to exclude others from using, selling or manufacturing a patented product associated with invention patents. Thus, priority certificates are significantly less intrusive upon personal and economic rights than invention patents and do not have the negative side effects associated with monopolies.

Priority certificates are primarily ‘about giving credit where credit is due’. The priority-certificate system may

65 See eg <http://www.newworldencyclopedia.org/entry/Gene>.

66 See eg Mora et al ‘How Many Species Are There on Earth and in the Ocean?’ (2011) 9(8) *PLoS Biology* e1001127, doi: 10.1371/journal.pbio.1001127. <http://www.sciencedaily.com/releases/2011/08/110823180459.htm>.

67 See eg K Lybecker, ‘Promoting Innovation: the Economics of Incentives’ *IP Watchdog* (21 July 2014). Available at <http://www.ipwatchdog.com/2014/07/21/promoting-innovation-the-economics-of-incentives/id=50428/>.

help scientists and innovators receive the credit and recognition they deserve for their discoveries and ideas by providing a clear and uniform procedure for securing recognition by a formal document, a priority certificate, issued by a trusted and impartial party. Further, the priority-certificate system helps institutions such as universities and research companies to receive credit and recognition for the ideas conceived and the discoveries made as a result of research performed by such institutions. It is uncontroverted that society draws important economic benefits from establishing an environment where credit is given to the actual creators and authors for their intellectual achievements. Thus society will be the ultimate beneficiary of the improved and fairer research and creative environments brought about by the priority-certificate system.

Implementing and running a functional priority-certificate system may involve significant intellectual and logistic challenges. Although at present the prior art searching and examination of applications may still be relatively expensive, it is quite likely that future

advances in areas such as artificial intelligence, software engineering and computer hardware will significantly decrease the costs and improve the quality of searching and examination. We are confident that, once the public becomes aware of this proposal, innovators and IP professionals will find creative solutions to the logistic issues associated with implementing and running a priority-certificate system. Thus, even if at this time implementing a priority-certificate system may be challenging, it is possible that the further IT advances and the creative solutions proposed by scholars and IP professionals in the near future will bring the price of prior art searches and examination to a level that makes the implementation and running of a priority-certificate system economically feasible.

In conclusion, we are confident that, in the coming years and through the efforts of many scholars, IP professionals, scientists and creative thinkers, non-intrusive forms of IP for protecting abstract ideas and discoveries, such as the priority certificate, will emerge and significantly improve research and creative environments.